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MEDICAL HELMINTHOLOGY: A REVIEW.—Part I.

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Introduction.

Of the many notable advances made in our knowledge of the parasitic worms during the past ten years, probably among the most important in relation to preventive medicine were those dealing with:—

(A) The elucidation of the life-histories of *Paragonimus westermanii*, *Clonorchis sinensis*, and the Bilharzia worms, of *Dibothriocephalus latus* and *Sparganum mansoni*, and of *Ascaris lumbricoides* and *Loa loa*.

(B) The recognition of the importance in diagnosis and classification of the characteristic design of the helminth egg, the consequent elaboration of methods whereby these eggs could be easily and rapidly recovered from the discharges of the living patient, and the utilization of the method of microscopical diagnosis in eradication campaigns.

(C) The application of serological methods to the diagnosis of helminth infections.

(D) The intensive study on a large scale of the anthelminthic values of drugs and of the best and safest methods for their administration.

(E) The methods whereby helminth infections could be best controlled through supervisory control of food, intermediate hosts and night soil.

Of less immediate interest, although of scientific and possibly ultimately of practical importance, are those dealing in the (*a*) extensions in the known geographical distribution, notably of Onchocerca and Heterophyes; (*b*) the occasional or innocuous occurrence in man of parasites found in domesticated animals; (*c*) changes in nomenclature consequent upon advances in general systematic studies of the group, or upon subsequent identification of parasites regarded as peculiar to man with forms previously recorded in other animals.

Platyhelmia—Trematoda (Hermaphroditic forms).

Paragonimus westermanii.

Cobbold's surmise that a crustacean might prove to be the intermediate host of the lung fluke was confirmed by Kobayashi in 1917 and Nakagawa in 1918. Previous to this, however, Moriyasu, Arima

and TANAKA in 1914 had induced infection experimentally in dogs by feeding to them crabs collected from an island in the mouth of the Han River in Korea, where over 30 per cent. were found to harbour encysted cercariae. NAKAGAWA, who worked at this subject in Formosa, reported in 1916 that cercariae occurred naturally in *Melania libertina* and *M. obliquegranosa* and that *Potamon obtusipes, P. dehaani* and *Eriocheir japonicus* were second intermediaries. These facts were confirmed by YOSHIDA, working in Japan during the same year. That the crab might be a carrier of other cercariae was pointed out by YOKOGAWA (1917) and NAKAGAWA (1918). In 1919 NAKAGAWA recognized that the forms, described and illustrated by him in the *Journal of Experimental Medicine* as stages in the development of Paragonimus, were the young stages of *Stephanolecithus parvus.* In the *Journal of Parasitology,* Vol. 6, he replaces his earlier figures and description by new matter.

Writing in 1920 R. ANDO gives an account of attempts to infect experimentally crabs with one of the fifteen cercariae which infest the Melanias in districts where Paragonimus is endemic. That infection of man necessarily depends upon the consumption of uncooked crab or crayfish is controverted by several writers. YOSHIDA in 1916 pointed out that the cercariae migrate through the tissues of the crabs and may be discharged into water from the gills. YOKOGAWA and SUZEMORI (1920) have shown that free larvae cannot penetrate the skin but can enter through the mucous membranes or through wounds and survive.

In some regions the degree of infection is extraordinarily high. KAKAMI (1916) states that in some villages in Korea it attains 82 per cent. in man, 48 per cent. in the dogs and 1–2 per cent. in the pigs.

Although Paragonimus is eminently an infection of the Far East, recent research has disclosed the parasite in Peru (ARCE, 1915) and Yucatan (LARA, 1913), while in Venezuela a high percentage of dogs harbour the parasite, although there it has not yet been recorded from man. In the United States the parasite is sporadic in pigs. WARD has attempted to differentiate three species, *P. ringeri, P. westermanii* and *P. kellicotti,* but KOBAYASHI (1917) does not admit the validity of the specific characters. ODHNER has made a valuable study of the relationships of the lung fluke with allied forms and has placed it with these in a new family, *Troglotremidae.*

Various forms of treatment have been tried with little success. X-rays and radium have no effect (NAKAGAWA, 1916) but ANDO (1917) believes that emetine had some good results, lessening the sexual activity of the worms although it failed to dislodge them. KIKUIKO and IMAMURA report similarly. ANDO has applied the complement fixation test successfully to the diagnosis of infection, while ANTO and YAMATA (1916) find that severe lung involvement is readily distinguished by X-rays, but that the detection of light infections is more difficult owing to the resemblance of the picture to that obtained in cases of tubercle.

The control of the disease may be effected by eradicating either the molluscan or crustacean intermediaries. Attempts have been made to deal with the former by collecting the adult snails.

Clonorchis sinensis.

Like *Paragonimus westermanii, Clonorchis sinensis* requires two intermediary hosts. The essential metamorphosis takes place in a

mollusc, but the cercaria in the case of Clonorchis encysts in fresh-water fish. KOBAYASHI in 1912 discovered this first link in the chain of infection by feeding cats with the flesh of *Pseudorasbora parva* and *Leucogobio guntheri* in which encysted cercariae occurred naturally in large numbers. In 1915 he extended the list of cercaria-carrying edible fishes to twelve species, and in a later paper (1917) gave reasons, based upon an examination of the worms obtained by experimental infections, for rejecting the differentiation of *Clonorchis endemicus* as a distinct species from *C. sinensis*. He also expressed the opinion that the first intermediary would prove to be one of the species of Melania, probably *M. libertina*. This surmise, however, has been proved to be incorrect, for in 1918 MUTO implicated *Bythinia striatula* var. *japonica*. The high degree of infestation in Chinese is illustrated by the statistics published by GUNN (1916), showing that over 20 per cent. of the Chinese arriving at San Francisco were infected. MAYER (1916) found similarly an incidence of 41·9 per cent. in the Chinese crews arriving at Hamburg. In MAYER's cases there were no clinical symptoms. LEIPER has pointed out that the statistics of Clonorchis incidence may require drastic revision owing to the similarity of the egg of this parasite to those of Heterophyes and Metagonimus, which are likewise frequent parasites in the Chinese and Japanese. Cases occur in which symptoms develop resembling beriberi with ascites, and in one such case recorded by SAMBUC and BEAUJEAN (1913) no less than 21,000 were present, weighing approximately 300 gm. Clonorchis and its allies live in the bile ducts, but two cases are reported by SAMBUC (1911, 1913) in which there was an invasion of the pancreatic duct and its branches.

A detailed study of the clinical and pathological features of this infection has been made by MEBIUS (1920).

Opisthorchis felineus.

CIUREA (1917) considers that ASKANAZY was in error in the experiments which he did in 1905 on the transmission of *O. felineus*. The larval forms with which ASKANAZY was working were apparently Holostomes. CIUREA has isolated the encysted cercariae from *Tinca tinca* and *Idus idus*. They attain adult form in dogs or cats twelve days after feeding.

Fasciolopsis buski.

Discussion still continues on the number of species of Fasciolopsis found in man, the tendency being to reduce the various forms to the single species, *F. buski*. BROWN (1917), working on a large amount of material, divides these parasites into two groups, one tallying with the accepted descriptions of *F. buski*, the other corresponding closely to WARD's description of *F. rathouisi* except for the fact that spines are present. For this latter group he unnecessarily creates a new specific name, *F. spinifera*. GODDARD (1919) gives an interesting account of the clinical conditions resulting from varying degrees of infestation. The association of anaemia and chronic diarrhoea in Shaohsing is pathognomonic of Fasciolopsis infestation. In the final stages the most prominent and distressing symptom is the oedema. The life-history has been traced in Formosa by NAKAGAWA (1921). The intermediate host is *Planorbis coenosus* or *Segmentina largillierti* and the development and later encystment are very similar to that of *Fasciola hepatica*, to which Fasciolopsis is nearly related. Pigs and dogs were experimentally infected with encysted cercariae.

Fasciola hepatica.

The life-history of *Fasciola hepatica* was worked out in essentials by THOMAS in 1881. He showed that after development in *Limnea truncatula* the cercaria encysted upon grass. In 1914 SSININTZIN showed that the cercaria frequently encyst free in water and may thus be taken into the body by drinking. The same observer also demonstrated that the freed cercariae migrate to the liver, not via the bile duct, but by penetrating first the intestinal wall and then invading the surface of the liver from the peritoneal cavity.

Several additional cases of accidental infection of man have been reported from France. ROMERO SIERRA (1918) records a case in Venezuela. ITURBE and GONZALEZ (1919) consider that *Ampullaria luteostoma* is the intermediate host in Venezuela, while in the United States BOYD (1920) suspects *Physa fontinalis.* In South Africa Dr. Annie PORTER has infected animals experimentally from *Isidora tropica* and *Limnaea natalensis.*

In an interesting study of the bionomics of *Limnaea truncatula,* WALTON has shown that this mollusc may occur not only in low marshy ground but also in the gutters and ditches on mountain roads.

Echinostomidae.

Five new cases of infection with the rare fluke *Echinostoma ilocanum* are reported by HILARIO and WHARTON from the Philippines (1917). A new genus, *Artyfechinostomum,* is made by LANE (1915) for a species termed *A. sufrartyfex,* based upon sixty-three flukes passed by a girl of eight in Assam. LANE (1917) does not consider that this parasite is the same as the *Echinostoma malayanum.*

Dicrocoelium lanceatum.

There are few records in literature of the occurrence in man of this parasite of sheep. MESNIL, in a verbal commentary on a paper by DE LAVERGNE (1916), stated that recently he had seen the eggs of this fluke in the stools of a Belgian officer who had spent a considerable time in the Congo and later in German East Africa.

Heterophyes heterophyes.

Relatively little work has been done on this parasite, which has been known since the time of BILHARZ to be of common occurrence in Egypt. During the war O'CONNOR recorded two cases in British troops stationed in Egypt. In 1913 LEIPER drew attention to the frequency of this parasite in Chinese and Japanese crews entering the Port of London. Recently CORT (1921) has drawn attention to a description of a new species of *Heterophyes* named *nocens* and described in Japanese in 1915 by ONJI and NISHIO. [A re-examination of material from the Chinese and Japanese cases with specimens collected in Egypt does not reveal any constant specific differences.]

ONJI and NISHIO find that infection is acquired from raw fish, especially of the species *Mugil cephalus.* Reference should be made to the invaluable discussion of the systematic position of the genus *Heterophyes* by RANSOM in 1920.

Loxotrema ovatum.

In 1913 YOKOGAWA found a frequent but apparently innocuous parasite in the small intestine of man in Formosa, Japan and Korea. LEIPER and ATKINSON found it to be common in dogs in Shanghai

(1915). This parasite was first named *Heterophyes yokogawai* by KATSURADA, but was later transferred to a new genus (1913) named by KATSURADA *Metagonimus* and by LEIPER *Yokogawa*. It would appear, however, to be the same as that named in 1908 by KOBAYASHI as *Loxotrema ovatum* and found by him experimentally after feeding animals upon fish containing encysted cercariae. YOKOGAWA found the cercarial stages chiefly in the fish *Plecoglossus altivelis*, seldom in Crassius or Cyprinus in Formosa. MUTO (1917) described as the developmental stages a redia and cercaria found in up to 50 per cent. of *Melania libertina* in the endemic region of Kaishu in Korea, and successfully infected gold fish and carp, later infecting cats from these.

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* References are to summaries in the *Tropical Diseases Bulletin* unless otherwise stated. Dates in parentheses refer to year of publication of original papers.

PLAGUE.

HAYDON (L. G.). **Sporadic Outbreaks of Plague in the Union of South Africa.**—*Lancet.* 1921. Nov. 26. pp. 1103–1104.

This is a short paper of considerable interest. The author, who is Assistant Health Officer for the Union of South Africa, notes that the occurrences since 1916 have differed in character from epidemics previously reported in the following particulars :—

" (1) The outbreaks were confined to persons or small groups of persons living in rural areas less densely populated than the bulk of South Africa, and remote from larger towns and villages.

" (2) Investigation and the closest inquiries failed to elicit the existence of ' domestic ' rodents at or anywhere near the scene of the outbreaks. The nature and structure of the farm-houses and native huts in which many of the cases lived was such as not to favour the existence of domestic rodents.

" (3) The time intervals between adjacent groups of cases was irregular, being in some instances a few weeks, and in other instances as much as many months. The distances between the scene of such outbreaks as would at first sight appear to have a common source of infection were in some instances as great as 50 miles, the intervening population remaining unaffected and the closest investigation failing to elicit any connexion, personal or through verminous fomites, between the groups of cases. Many of the cases occurred in persons living on isolated farms of several thousand acres, and having limited intercourse with their neighbours."

The Central Health Department failing to find any source of infection or means of transference of infection from one group to another, Dr. MITCHELL, Secretary for Public Health, decided to have investigation made into the species, habits and morbidity (if any) of the wild rodents of the affected areas. The results of this inquiry were, in the early months of 1921 :—

" The area of country involved, with a radius of about 150 miles, may be roughly described as flat or gently undulating plains intersected by watercourses which only contain flowing water for a few months of the year, but in the valleys of which occasional pools may remain longer. These valleys are fringed with low scrub and vegetation, varying from a few to several hundred yards in width. The soil generally is a light sandy loam. The indigenous vegetation is grass, patches of low scrub, wild melons and cucumbers and the like, which usually grow in such latitudes in plains with scanty rainfall. The area is divided into farms of from 1,000 to 5,000 acres, and is mostly concerned with the raising of sheep and the production of maize and other cereals. The human population, both white and native, is very sparse and widely separated. The conditions generally favour the existence of the smaller wild animals, especially rodents, which find harbourage by burrowing under the roots of grass and the low scrub."

The animals captured were :—

Common Name.	Name as determined by an official of the Transvaal Government Museum.
Gerbille or gerbil	*Tatera lobengulae.*
Large-eared mouse	*Malacothrix typicus.*
Fat mouse	*Steatomys pentonyx.*
White-tailed mouse..	*Mystromys albicaudatus.*
Tree mouse	*Dendromys melanotis.*
Dwarf mouse	*Leggada deserti.*
Striped field mouse	*Rhabdomys pumilio.*
Multimammate mouse	*Rattus coucha.*
Namaqua rat	*Rattus namaquensis.*
Golden rat	*Rattus chrysophilus.*
Ground squirrel or meer cat ..	*Geosciurus capensis.*
Spring hare	*Pedetes caffer.*
Yellow hare	*Lepus ochropus.*
Kolhaas	*Lepus zuluensis.*
Red hare	Pronolagus.
Suricate	Suricatta.
Slender mongoose	*Galerella caaui.*
Yellow mongoose	*Cynictis penicillata.*
Muishond	*Ictonyx striatus.*

Out of this number the gerbille and the multimammate mouse proved to be plague-infected, and showed a very heavy mortality over a wide area. Both are strictly nocturnal; neither lives in farm-houses or huts, but the mouse has been found in farmyards and is considered to be the conveyer of plague.

J. H. Tull Walsh.

LEGER (Marcel) & BAURY (A.). **La musaraigne** *Crocidura stampflii* **et la peste au Sénégal.**—*C.R. Acad. Sci.* 1922. Feb. 6. Vol. 174. No. 6. pp. 423–426.

During the Dakar epidemic it was thought that the shrew undoubtedly "played a part different to that of the rodents but not without importance." It inhabits native huts, and, although insectivorous, will eat other food found in houses. Between the end of September and the end of December, 1921, the authors examined 861 rats and 267 shrews captured in Dakar town. Among the rodents *B. pestis* was found 93 times, or 10·8 per cent.; among the shrews it formed 9·37 per cent., and upon Crocidura *X. cheopis* is most commonly found. In India *C. cerulea* did not suffer from plague and resisted inoculation with *B. pestis.* In Dacca (Bengal) *X. cheopis* was found on shrews but rarely. KERANDEL [this *Bulletin,* Vol. 5, p. 394] writes that in Cambodia *C. murina* "constitutes a reservoir of virus of plague." *X. cheopis* was found on this species. [Although shrews do not actually die of plague during an epizootic outbreak among rodents, infected fleas would leave dead rats or mice for shrews living in the same houses.] CADET confirms KERANDEL for S. Annam. Shrews consorting with rodents should therefore be destroyed.

J. H. T. W.

i. TEPPAZ (L.). **La peste murine à Dakar en 1921 (juillet-août-septembre).**—*Bull. Soc. Path. Exot.* 1921. Nov. 9. Vol. 14. No. 9. pp. 514–516.

ii. NOC (F.). **Au sujet de la peste murine à Dakar.**—*Ibid.* pp. 516–519.

i. Dr. Teppaz begins his paper with a quotation from ROUX and YERSIN :—"Plague which is at first a disease of rats soon becomes a

disease of man." Upon this text his work was based, and with the help of M. BAURY the author studied the rat epizootic during the epidemic. Working in the Institute of Biology, Dakar, they received from the Municipal Sanitary Corps, daily, a varying number of rats, mice and shrews, living or dead. Dead animals were examined at once; living rats, etc., were isolated. After 10 days rats, mice and shrews which still remained alive were killed and examined. During July 240 dead rodents showed 89 suffering from plague; 328 rodents killed after observation showed only 28 cases of infection. In the same month 598 cases of human plague were reported, with 438 deaths. The figures for August and September were:—(1) 362 dead rodents, with 115 suffering from plague; (2) 34 living, of which only 3 were infected, and (3) 519 of both classes, with 10 infected. During August there were 261 cases of human plague with 191 deaths; in September the figures for human plague show the same dimunition as is seen in the rat plague—39 cases, with 25 deaths.

ii. Dr. Noc's paper is a commentary on Dr. TEPPAZ's work, and recalls similar examinations of rodents in 1914, 1919 and 1920. He notes that the flea most commonly found was *X. cheopis*, and on one occasion *Pulex irritans*.

J. H. T. W.

RIGOLLET. **Note sur la peste à Dakar en 1921.**—*Bull. Soc. Path. Exot.* 1921. Dec. 14. Vol. 14. No. 10. pp. 627–630.

The author contrasts the mortality among cases treated in a hospital and those seen or treated in their own homes: 39 per cent. for the former and 88·8 per cent. for the latter. He points out that among the troops, most of them protected by anti-plague vaccination, the death-rate was only half that which occurred among the unvaccinated civil population.

J. H. T. W.

MORA (A. Damas). **Apontamentos sôbre a epidemia da peste bubónica em Loanda (Fevereiro a Junho de 1921).**—*Rev. Méd. de Angola.* 1921. Aug. No. 1. pp. 11–153. With 3 plates and 3 charts.

This is a detailed account in two parts. Part I deals with history and laboratory diagnosis, epidemiology and sanitary prophylaxis. Plates show structure of flea and method by which the plague bacillus is conveyed from rat to man. Part II contains (pp. 103–153) statistics and clinical notes of the Loanda epidemic. The 65 cases are arranged in four groups, but diagnosis was only confirmed by bacteriology in series 3 and 4. The cases were generally of a mild type. Death-rate 38·5 per cent. It is recorded that plague patients were found to have bacilli in the nails (*v.* p. 119); fragments of nail placed in broth gave a culture of *B. pestis* after 48 hours.

J. H. T. W.

BAKER (C. J.). **Plague. The Kampala Epidemic of 1920.**—*Uganda Protectorate Ann. Med. & San. Rep. for the Year ended 31st December, 1920.* pp. 64–66.

The author, during the period upon which he reports, was Acting Medical Officer of Health in Kampala. Human plague was first noticed in the bazaar on December 24, 1919, and in that month there were four cases. Disease among rats had occurred at Port Bell during the previous October, infection being traced to plague stricken

rats on one of the lake steamers carrying hides. From Port Bell it reached Kampala. During January, February and March there were 57 cases, all among natives living in the bazaar. The usual sanitary and quarantine measures were instituted; but Dr. Baker writes:—"Towards the middle of March I came to the conclusion that the guards and barriers were doing very little good as the natives had found means of avoiding them, and as they seriously affected the trade of the town they were the cause of much discontent." Co-operation was sought and lectures given to Europeans and to about 100 Indian Merchants. A committee of Indians was formed and personal effects and houses were disinfected. The epidemic ceased about March 18. Meanwhile the epizootic among rats had spread to the Namirembe Market, two miles away. Though "none of the Indians contracted plague (most of them had been inoculated in December and January, as well as in April), some of their native employees were stricken, and the disease spread to an alarming extent in the neighbouring native dwellings—chiefly in Rubaga, Mengo and Namirembe hills." . . . . . "The plague quickly died out where rat driving was vigorously conducted": but remained active within an area of five miles from Kampala until the end of 1920. 10,517 rats were killed within the township and 10,322 were sent in from outside. 13,992 inoculations with anti-plague vaccine (Haffkine's) were made, mostly in January, April and May. Of the fatal cases 53 had received the vaccine. Of 300 cases in 1920, 175 were bubonic, 32 pneumonic and 93 septicaemic. Of these 26 recovered—all bubonic. Plague serum was not used in treatment; but the author gives the results which followed the use of iodine, eusol and carbolic acid in the few cases treated.

J. H. T. W.

BARTHÉLEMY (Prosper). **La peste à bord du "Cronstadt" en rade de Bizerte au mois de juillet 1921.**—*Bull. Acad. Méd.* 1921. Dec. 6. Vol. 86. 3rd Ser. No. 40. pp. 326–328.

The "Cronstadt" formed part of the Russian Black Sea fleet and arrived at Bizerte early in January. There had been cases of typhus and recurrent fever on board and the ship was disinfected with sulphur by the "Clayton" method. From January to June the ship remained at Bizerte and had a clean bill of health. The source of infection was not evident when plague broke out on the 2nd of July, four cases occurring on that day. There were in all 19 cases, with seven deaths. On reflexion the source of infection was thought to be rats which had escaped destruction during the fumigation and were hiding in some sacks of spoiled wheat in a special hold not opened until the end of June.

J. H. T. W.

GOBERT (E.). **La peste dans le sud tunisien en 1920–1921.**—*Arch. Instituts Pasteur de l'Afrique du Nord.* 1921. Dec. Vol. 1. No. 4. pp. 440–446.

Records three outbreaks of plague, which spread from east to west, starting in July, 1920, in the plantations of Ben Gardena. The rodents implicated were field rats and gerbilles (*cf.* HAYDON, *supra*, p. 366). Rodents made their appearance in large numbers on cultivated areas, destroying grain, figs and dates and even attacking the olives. The author writes that the "exceptional pullulation of these rodents constituted a veritable calamity for the region; from one rat-hole alone 5 litres of ears of corn were taken." Plague cases were isolated;

contacts were isolated and vaccinated. The neighbouring population was vaccinated. Antiplague serum was reported, by the medical officers of the various regions affected, to be distinctly useful in the treatment of plague cases. Of the value of antiplague vaccination the following bears witness :—" I had 100 per cent. mortality among the unvaccinated and among those who received serum too late. Among sixteen patients, some vaccinated and others treated at once with serum, there was only one death." (Dr. CAMPAIGNOLLE, at Zargis).

J. H. T. W.

i. DE GOYON (J.). **L'épidémie de peste à Tamatave de février à avril 1921.**—*Bull. Soc. Path. Exot.* 1921. Nov. 9. Vol. 14. No. 9. pp. 602–609. With 1 text fig.

ii. GOUZIEN (P.). **A propos de la peste de Madagascar.**—*Ibid.* pp. 610–621.

i. Dr. de Goyon's paper records an outbreak of bubonic plague distinctly related to previous disease among rats. There were 107 cases with 71 deaths. The clinical forms observed were :—

(1) Bubonic	(*a*) inguinal	48
	(*b*) axillary	25
	(*c*) cervical	9
(2) Septicaemic		6
(3) Bubonic with pulmonary complications		2

Tamatave is exposed to infection owing to its position and its constant intercourse with ships from East Africa and from the Suez Canal.

ii. Dr. Gouzien remarks that his paper forms a sequel to that of Dr. Goyon, since it records an epidemic of pneumonic plague which was traceable to the bubonic cases.

J. H. T. W.

ALLAIN. **L'épidémie de peste de Tamatave en mars et avril 1921.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1921. July–Aug.–Sept. Vol. 19. No. 3. pp. 247–263.

The same outbreak as noticed under GOYON. Dr. Allain is Inspector of Colonial troops and his report is a detailed résumé of work done by other medical officers. He draws attention to the satisfactory results which followed the treatment by large injections (intravenous) of antiplague serum, and he considers that the 60 per cent. death-rate would have been much reduced if cases could have been seen and thus treated before the patient's condition became desperate. An antiplague vaccine made in Paris was used for prophylaxis. The vaccine prepared at the Pasteur Institute at Antananarivo was also used: Dr. Allain believes that the local Pasteur Institute should keep always ready 1,000 flasks of liquid antiplague serum, 2,000 flasks of dried serum and 500 flasks of antiplague vaccine.

J. H. T. W.

ALLAIN. **L'épidémie de peste pulmonaire de Tananarive (juin-juillet 1921).**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1921. Oct.–Nov.–Dec. Vol. 19. No. 4. pp. 379–418.

The Medical Inspector of Colonial Troops describes the cases of pneumonic plague during an epidemic which began in Tamatave in

the usual way with rat-plague and bubonic plague among human beings :—" Towards the end of the month of June, 1921, a native reported to the administration that an abnormal mortality had occurred in two families . . . . one after the other succumbed to a disease which was like a foudroyant pneumonia." Dr. BLIN was directed, as Director of the Municipal Hygiene Department, to enquire as to the cause of these deaths. The native doctors stated that the persons died of a virulent kind of pneumonia, a disease common at that time of year (the coldest season). Even poison was suggested, but a woman accused was able to prove her complete innocence. The two families met at a wedding which lasted from the June 15 to June 20, and it was from the latter date that the deaths began. On June 29 two persons, man and wife, died on the way to the Ankadinandriana hospital. A post-mortem examination was made the same day. Smears from the spleens in each case showed plague bacilli in enormous numbers. A young woman and her brother died with the same symptoms on June 30, and other cases of a similarly sudden nature occurred during July. Dr. Allain believes that the virus came from Tamatave ; but he failed to discover the route and vehicle of infection. There was no epizootic in Tananarive. There were in all 46 deaths between June 24 and July 22, a mortality of 100 per cent. In most of these cases no treatment was possible, but one person who lived for three days received 300 cc. of antiplague serum intravenously : Dr. Allain remarks that much larger doses should be given. The usual sanitary precautions were taken to prevent spreading of the infection, and vaccination was made compulsory by an order from the Governor General dated July 22. The town was declared free from plague on August 7. No European was attacked.

J. H. T. W.

GARNIER. **Le choléra et la peste en Indo-Chine pendant les années 1919 et 1920.** – *Ann. de Méd. et de Pharm. Colon.* Paris. 1921. Oct.–Nov.–Dec. Vol. 19. No. 4. pp. 418–423.

The chief facts concerning plague are summarized in Table II given below :—

Name of Colony.	1919.						1920.					
	Cases.		Deaths.		Vaccinations.	Number of rats destroyed.	Cases.		Deaths.		Vaccinations.	Number of rats destroyed.
	Europeans.	Natives.	Europeans.	Natives.			Europeans.	Natives.	Europeans.	Natives.		
Tonkin	..	..	..	..	..	..	..	2	..	1	..	..
Annam	..	196	..	..	19,015	16,512	..	266	..	227	33,562	19,414
Cochin China ..	1	194	1	140*	12,712	..	..	102	..	71	6,126	1,273
Cambodia	..	74	..	114*	4,262	65,991	..	249	..	242	14,234	80,957
Laos	..	..	..	72*	..	..	..	..	..	..	..	..
Territory of Kouang-Tcheou-Wan ..	..	378	..	378	..	..	..	30	..	29	..	..
Totals ..	1	842	1	704	35,989	82,503	..	649	..	570	53,922	101,644

* These figures are reproduced as in the original, but apparently need moving up one space to adjust the table.

Plague is said to be endemic in Annam and Cochin China. The forms observed were bubonic and septicaemic plague. There is, however, a noticeable diminution in the number of plague cases, which happy result is ascribed to rigorous application of preventive measures carried out by the local authorities. Houses not capable of sanitary disinfection are destroyed, the owners receiving compensation. Notification of cases is compulsory and the patients are isolated and treated in special hospitals.

J. H. T. W.

i. Wu Lien Teh. **Second Pneumonic Plague Epidemic in Manchuria, 1920–1921.**—*Nat. Med. Jl. China.* 1921. Sept. Vol. 7. No. 3. pp. 98–121.

ii. ——. **Plague in the Orient with Special Reference to the Manchurian Outbreaks. An Address delivered at the opening of the Union Medical College, Peking, September 16th, 1921.**—*Ibid.* Dec. No. 4. pp. 178–201. With 4 text figs.

i. Article No. 1 consists of brief bulletins notifying the appearance of bubonic plague at Hailar, November 26, 1920; followed by cases of septicaemic and pneumonic plague in January, 1921. Other outbreaks occurred in various parts of Manchuria. At Tehchow, in Shantung, 90 deaths occurred from pneumonic plague. It is not easy nor is it necessary to give the statistics, and the sanitary and precautionary measures were those usually adopted.

ii. The author writes that :—" Whether Dr. W. J. Simpson be right or wrong in naming China's south-western province of Yunnan " as the primary focus of plague infection, " there is no doubt that since the great pandemic of 1894 the endemic areas have increased both in number and extent." He then gives a useful " table " showing the death-rate in various parts of the Orient.

Location.	Years.	Year of severest infection.	Total Plague Deaths.	Aggregate Population.
India	1896–1917	1907	9,841,396	320,000,000
Ceylon	1914–1917	1914	978	800,000
Straits Settlements ..	1910–1917	1917	280	1,000,000
Dutch East Indies ..	1911–1917	1917	34,732	40,000,000
Siam	1911–1917	1916	1,063	9,000,000
Indo-China (French) ..	1911–1917	1913	14,911	18,000,000
Hong Kong	1895–1917	1914	15,731	520,000
Japan	1907–1916	1907	1,380	50,000,000
Formosa (Japan) ..	1896–1917	1901	24,108	3,400,000

Except for Shanghai and Manchuria, the former controlled by an efficient Health Department of the International Municipal Council, the latter by the Manchurian Plague Prevention Service, statistics are difficult to obtain. The Manchurian outbreaks are then briefly reviewed and a " table " is given showing: locality, type of plague and mortality from 1910 to August, 1921. The greatest epidemics occurred in 1910–11, 1917–18, and 1920–21, when 60,000, 16,000 and 9,000 persons died. Dr. Wu was responsible for the management of the first and third epidemics. The first found China absolutely unprepared, but funds were obtained and by April, 1911, plague had

been stamped out from Harbin, southwards to Shantung. The Manchurian Plague Prevention Service had been established for nine years when the 1920–21 epidemic appeared; the value of its work is shown in the reduced mortality. The photographs show a group of marmots (Tarabagan) *Arctomys bobac*; patients with pneumonic plague and doctors, protected by masks, performing experiments on marmots. The tarabagan and also the smaller marmot, *Spermophilus citellus*, easily succomb to pneumonic plague produced by inhalation of *B. pestis* in spray.

J. H. T. W.

WASILEWSKI (A.). **Epidemja dzumy plucnej na Dalekim Wschodzie w 1921 r.—Epidémie de la peste pulmonaire en Extrême Orient en 1921.**—*Przegl. Epidemjol.* Warsaw. 1921. Vol. 1. No. 6. pp. 638–645. With 3 charts in text. [French summary, p. 645.]

This epidemic occurred in the Trans-Baikal region of Eastern Siberia. Hunters of marmots, living on the steppes, were the first victims. Such epidemics last generally for 12 to 13 weeks. Two forms of plague, pulmonary and bubonic, are produced by the same infection. The author believes, contrary to other opinion, that antiplague vaccination has no influence upon pulmonary plague.

[Pneumonic cases are usually more severe than bubonic and more vaccinated persons would probably die of pulmonary plague than of the milder bubonic form. Nothing is said as to the use of antiplague serum for treatment.]

J. H. T. W.

HYLKEMA (B.). **De rattenvlootheorie en de pest in Europa.** [The Rat Flea Theory and the Plague in Europe.]—*Nederl. Tijdschr. v. Geneesk.* 1922. Vol. 66. Pt. 1. No. 4. pp. 375–392. With 1 curve.

The author advocates the probability of the human flea playing an important part in the spreading of plague under European circumstances. He criticizes the rat-flea-man theory, and thinks that the connection between rat plague and human plague is not at all an immediate one. The curve of rat plague preceding that of human plague in Bombay, f.i., has been obtained by comparing the number of rat corpses found with the number of rats caught in traps, etc., figures dependent upon different factors. If, however, the percentage of plague rats among the total number caught is marked in the curve the lines of rat plague and human plague show a striking parallelism, suggesting that the disease in both species may be brought on by the same factor. This factor is the rat flea, the transfer of which over longer distances with goods and in the vicinity by its own motility explains as well the plague spreading per saltum as that per contiguity. In the flea the plague virus may remain active for a long time, which is possible neither in man nor in rats. This persistence in the flea may account for the seasonal recurrence of plague epidemics (Bombay and, in former centuries, Europe).

In Europe, especially in the recent plague epidemic in Paris, the connection between rat plague and human plague remained uncertain. No rat plague has been shown with certainty, and on the other hand

probable transfer of human plague by people watching the corpses of plague sufferers has been observed. In the class of people among which plague occurred fleas are very common. The author quotes other European plague epidemics of the later years in which no connection with rat plague could be detected. Possibly the infection has been brought over in these epidemics by human fleas from ships.

In former centuries the hygienic circumstances in Europe made fleas more prevalent than nowadays and this way of transmission of plague in the serious epidemics of those days may have been the usual one, especially as no connection with rat plague was observed then.

In the natives of the tropics, with their thin clothing and greater bodily cleanliness, human fleas are rare. The views on the spreading of plague in Europe have been too largely influenced by experience in the tropics.

W. J. Bais.

DE ARAUJO (Eduardo). **Determinações cutaneas da peste. Estatistica, aspecto clinico e pathogenia.**—*Bol. Soc. Med. e Cirurg. de S. Paulo.* Brazil. 1921. July & Aug. Vol. 4. 2nd Ser. Nos. 5 & 6. pp. 105–109.

An account of 60 cases of plague presenting cutaneous manifestations. The following classification of cases with their end-results is given by the author :—

	Total.	*Recovered.*	*Died.*
Vesico-pustules	36	8	28
Carbuncles	13	9	4
Inflammatory patches ..	2	0	2
Pustules and Carbuncles	7	2	5
Pustules and inflammatory patches	2	0	2
	60	19	41

Of these cutaneous lesions the most frequently occurring form was the vesico-pustular, in which the forms macule, papule, vesicle and pustule are rapidly passed through in succession. The chief feature of the eruption is its irregularity of development, all the various stages, up to cicatrization, being exhibited by the same patient. Large numbers of the pustules undergo complete cicatrization, leaving little or no trace behind. The death-rate in this form is high, the patients passing into a condition of profound adynamia which proves fatal in a few days. In this, as in the other forms, the plague bacillus is uniformly present in the lesions. In discussing the pathogenesis of these cutaneous manifestations of plague the author maintains that they are not an expression of plague septicaemia. Examination of the blood for the bacillus gave a uniformly negative result, and, in the author's opinion, the causal organism reaches the skin by way of the lymphatics, the cutaneous infection being secondary to that of the glands. In some of the cases under treatment by the author at the Bahia Isolation Hospital, Dr. Leoncio PINTO has demonstrated the existence of the plague bacillus in the cutaneous lymph channels.

F. S. Arnold.

HARTMAN (Henry) & BOWIE (Anna). **Postmortem Findings in Twelve Cases of Plague.**—*Jl. Amer. Med. Assoc.* 1922. Feb. 18. Vol. 78. No. 7. pp. 493–497. With 4 text figs.

In this paper the authors summarize the pathological conditions found in eleven cases of bubonic and one case of pneumonic plague. The deaths occurred during an epidemic in and around Galveston [see this *Bulletin*, Vol. 17, p. 389 (LEVY & MCMICKEN), also p. 394 (LEVY); Vol. 18, p. 349 (BOYD & KEMMERER)]. The results of the post-mortem examinations are given in a table.

DELAMARE (Gabriel). **Oedème pesteux primitif aigu.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1922. Jan. 19. Year 38. 3rd Ser. No. 2. pp. 94–98.

The author records the appearance of acute oedema widely diffused on the second day in a fatal case of plague. The only other visceral lesion was a small area of congestion at the base of the right lung. This spontaneous oedema in a human case resembles that which occurs in experimental inoculations when very virulent cultures are injected subcutaneously. This was evidently a virulent plague septicaemia. *B. pestis* was isolated from the sanguineous serum of the oedematous area and with it was also found *Streptococcus conglomeratus* which was not pathogenic for rabbits.

J. H. T. W.

KLING (C.) & HESSER (S.). **Om Pestbacillagglutination.** [The Agglutination of the Plague Bacillus.]—*Hygiea.* 1921. Vol. 83. No. 19. p. 625.

Three strains of the plague bacillus obtained from the Gesundheitsamt, Berlin, were morphologically and culturally normal but they had lost their virulence and were not agglutinated by some agglutinating serum obtained from Bern in a dilution of 1 in 10. [Normal serum agglutinates in lower dilutions.] Similar experiences were obtained with agglutinating sera from the Pasteur Institute and also from Dresden. The authors then proceeded to make some agglutinin of their own in rabbits instead of horses, as it is known the latter animals are especially liable to give sera which have very limited group agglutinability among the various strains. This they succeeded in doing by injecting plague bacilli killed at 60° C. into rabbits. The serum had a titre of about 1 : 6,000 and was made with a Pasteur Institute strain of plague bacillus. It agglutinated four other strains besides the homologous. They then passed the "Pasteur" strain through a guinea-pig and obtained the rather surprising result that it lost its agglutinability. This, however, returned after about nine subcultures on artificial media, but it was not so easily agglutinated as the original culture.

Two strains of plague bacilli were isolated from two rats which died in the same epizootic on a ship coming from Rio de Janeiro. One was agglutinated by the high titre serum but the other not at all.

All these observations go to show that the fact that a bacillus is not agglutinated by a specific agglutinating serum does not exclude its being the plague bacillus. [The same thing occurs with atypical cholera vibrios, etc.—J. H. T. W.]

E. E. Atkin.

EPSTEIN (Emil). **Ueber die Darstellbarkeit polgefärbter (pestbazillenähnlicher) Stäbchen bei verschiedenen Bakterienarten. Die Polfärbbarkeit als vitall, durch Bakterienwachstum in wasserreichen Nährmedien bedingte Erscheinung.** [Polar Staining of Bacilli allied to *B. pestis.*]—*Arch. f. Hyg.* 1921. Vol. 90. No. 4. pp. 136–154. With 1 plate.

Records the finding that bi-polar staining is not a phenomenon confined to *B. pestis* and the group to which it belongs. Laboratory workers should refer to the original for details and conditions under which this form of staining has been found by the author. The coloured plate shows *B. coli*; fig. 5 from Bouillon culture and fig. 6 from the heart blood of a guinea pig with well-marked and exclusive bi-polar staining. Among other conditions the method of fixing the specimen influences the result. Thus we find on the plate: figs. 8 and 9, showing the same bacillus, stained and fixed by heat, with general staining; whereas it shows bi-polar staining as a "living stain," the body of the rod not being coloured.

J. H. T. W.

i. WHITE (H. F.). **Various Aspects of the Plague Situation in the South.**—*Texas State Jl. Med.* 1921. Oct. Vol. 17. No. 6. pp. 307–309.

ii. JOITRAIN (E.). & DE GENNES (L.). **Nouveaux cas de peste bubonique avec septicémie observés à Paris.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1921. Dec. 15. Year 37. 3rd Ser. No. 36. pp. 1653–1658.

iii. BINNEY (E. H.). **Reminiscences of the Plague.**—*Med. Jl. Australia.* 1921. Nov. 5. 8th Year. Vol. 2. No. 19. pp. 398–399.

i. This is a paper read before the Section on State Medicine and Public Hygiene, State Medical Association of Texas, Dallas, May 11, 1921. The outbreaks of plague in Texas have already received notice in this *Bulletin* [see Vol. 16, pp. 428, 429, 433: WILLIAMS; HALL; HARRISON; Vol. 17, pp. 387, 389, 394; MCCOY; LEVY & MCMICKEN; LEVY].

ii. The author tells us that up to 1920, no case of plague had been reported in Paris since 1669. He adds, with clinical details, some fresh cases to those noticed in this *Bulletin*, Vol. 17, p. 392 and Vol. 18, p. 348.

iii. Refers to an epidemic which occurred in Sydney 20 years ago. Contains nothing new.

J. H. T. W.

COMBY (J.). **La peste bubonique à Paris.**—*Arch. de Méd. des Enfants.* Paris. 1921. Nov. Vol. 24. No. 11. pp. 681–688.

FILIPPINI (A.). **Le minacce della peste.**—*Policlinico.* Sez. Prat. 1922. Mar. 27. Vol. 29. No. 13. pp. 417–418.

GUINON (L.) & DE PFEFFEL. **Quelques aspects cliniques de la peste chez l'enfant.**—*Arch. de Méd. des Enfants.* Paris. 1921. Nov. Vol. 24. No. 11. pp. 670–675.

SPENCER (R. R.). **A Note on the Natural Immunity of Wild Rats to Plague.**—*Public Health Rep.* 1921. Nov. 18. Vol. 36. No. 46. pp. 2836–2838.

URIARTE (Leopoldo). **Profilaxis de la peste. El problema de las ratas y el carbonato de bario.**—*An. del Depart. Nac. Hig.* Buenos Aires. 1921. May & June. Vol. 27. No. 3. pp. 139–149. With 1 text fig.

CHOLERA.

GARNIER. **Le choléra et la peste en Indo-Chine pendant les années 1919 et 1920.**—*Ann. de Méd. et de Pharm. Colon.* Paris. 1921. Oct.–Nov.–Dec. Vol. 19. No. 4. pp. 418–423.

The author gives useful information, which is contained in two "tables."

CHOLERA.

Name of Colony.	1919.					1920.				
	Cases.		Deaths.		Vaccinations.	Cases.		Deaths.		Vaccinations.
	Europeans.	Natives.	Europeans.	Natives.		Europeans.	Natives.	Europeans.	Natives.	
Tonkin	2	1,100	..	654	2,180	..	401	..	263	7,380
Annam	..	328	..	224	19,415	..	141	..	81	5,124
Cochin China	4	3,190	2	2,355	90,000	3	995	1	611	67,580
Cambodia	..	1,227	..	1,005	8,500	..	98	..	74	3,476
Laos	..	507	..	507	1,720	..	..	..	..	..
Territory of Kouang-Tcheou-Wan	..	66	..	53	..	..	..	..	..	..
Totals ..	6	6,418	2	4,798	..	3	1,635	1	1,029	..
					121,815					83,560

The results of anticholera vaccination are regarded as satisfactory and further proof of its value is shown among the troops. They live side by side with the civil population but anticholera vaccination has been compulsory since 1917, with revaccination when cholera becomes epidemic. The death rate in 1919 was 26; in 1920 only two soldiers died of cholera.

J. H. Tull Walsh.

CRAWFORD (Wallace). **Cholera at Tzeliutsing.**—*China Med. Jl.* 1921. Sept. Vol. 35. No. 5. pp. 417–419.

Reports an ordinary and apparently mild epidemic of cholera. Saline injections were only required in 61 cases, of which 17 died. The remaining 81 cases were treated with kaolin and Squibb's mixture. Of these 22 died. There were in addition 94 cases of which no particulars as to treatment are given. It is recorded that: "In our hands every opium-smoker was a fatal case." One man found with opium on his person—apparently an opium-eater—recovered.

J. H. T. W.

NOMURA (Teiichi), SOTOMA (Gencho) & HARADA (Shiro). [**On Cholera Epidemic which broke out in Osaka during the Year 1920.**]—*Eiseigaku Densenbyogaku Zasshi.* (*Jl. of Hyg. & Infect. Dis.*). 1921. July. Vol. 16. No. 6. [Summarized in *Japan Med. World.* Tokyo. 1922. Jan. 15. Vol. 2. No. 1. p. 20.]

The authors observed 392 cases—261 males and 131 females. There were 77 carriers. Prophylactic vaccination reduced mortality to 1/10 per cent. and morbidity to $7\frac{1}{6}$ per cent. as compared with the non-vaccinated. It also reduced the number of carriers.

J. H. T. W.

SZYFMAN (L.). **Epidemjologja cholery w Brzésciu nad Bugiem. Epidémie de choléra à Brest-sur-Boug.**—*Przegl. Epidemjol.* Warsaw. 1921. Vol. 1. No. 6. pp. 646–649. (French summary p. 649.)

The first case, confirmed bacteriologically, occurred on October 13, 1920; the last on January 23, 1921. Total number of cases 121, of which 38 were "carriers," 83 actually suffering from cholera. Most of these patients were prisoners of war. The death-rate was 44·5 per cent.

Anticholera vaccinations and isolation of "carriers" helped to wipe out the epidemic. In view of the possible outbreak of a further epidemic in the following spring the author insisted on maintaining the sanitary measures and on repetition of anticholera vaccination. Suspects were submitted to bacteriological examination. [Methods of treatment are not recorded in the summary.]

J. H. T. W.

KOCH (Jos.). **Bemerkungen zu der Arbeit Sanarellis "De la Pathogénie du Choléra (Premier Mémoire). La défense naturelle du péritoine contre les vibrions."**—*Ztschr. f. Hyg. u. Infektionskr.* 1920–1921. Vol. 91. pp. 195–196.

The author points out that, although SANARELLI mentions the work of certain previous investigators, he has omitted reference to work done on the relation of the great omentum to vibrios and other bacteria by him. Dr. Koch published his paper, in 1911, in Vol. LXIX of the *Zeitschrift.* He agrees with SANARELLI as to the importance of the part played by the omentum [see this *Bulletin,* SANARELLI (G.), Vol. 14, p. 179; and Vol. 16, p. 28].

J. H. T. W.

BAUMGARTEN (W.). **Chemotherapeutische Versuche mit Akridinpräparaten an cholerainfizierten Meerschweinchen und Mäusen.**—[Chemotherapeutic Experiments with Acridine Compounds on Cholera-infected Guinea-pigs and Mice.]—*Ztschr. f. Hyg. u. Infektionskr.* 1920–1921. Vol. 91. pp. 511–537.

The author is an assistant in the "Robert Koch" Institute, Berlin. He states that, with NEUFELD and SCHIEMANN, he has already briefly recorded the action of acridine (trypanflavin) and other allied dyes on germs causing septicaemia; also on experimental infection (intraperitoneal) of guinea-pigs and mice with cholera vibrios. With regard to vibrios, development is checked or they are killed by solutions of 1 in 250,000 to 1 in 300,000. The germs lose their motion and clump. Thus, with injection of vibrios, acridine-nitrate was given to a guinea-pig (200 gm.). A control of the same weight showed numerous active vibrios and the animal died after six days. The first guinea-pig died after 14 days but the vibrios were destroyed. Diamino-acridine nitrate in small doses and trypanflavin both have a curative effect on guinea-pigs and mice infected with cholera vibrios. Tables and full details of the experiments are given.

J. H. T. W.

SANARELLI (G.). **De la pathogénie du choléra. [Cinquième mémoire.] Le "choléra intestinal" des jeunes animaux.**—*Ann. Inst. Pasteur.* 1921. Nov. Vol. 35. No. 11. pp. 745–796.

[For previous memoirs, see references, Vol. 17, p. 401.]

The author finds that very young rabbits are very susceptible to cholera infection. This sensibility, however, does not endure for any length of days. From the tenth day young rabbits, that previously would have died from diarrhoea and collapse, begin to resist infection and tolerate virulent cultures of *V. cholerae* administered in food. For ten days after birth the young rabbits are suckled. At the end of that time they take to a vegetable diet. The author writes :— "Strange coincidence : it is from that moment that they begin to show resistance to cholera infection." Careful investigation has resulted in the following conclusions :—

1. The gastric juices of very young rabbits do not allow the passage through the pylorus of any species of microbe that does not produce spores. The earliest species that reach the intestines are anaerobes. The duodenum is sterile.

2. The cholera vibrio administered, by the mouth, to suckling rabbits produces a fatal morbid condition which has little resemblance to true cholera in man.

3. Vibrios introduced into the buccal cavity of rabbits at the breast disappear rapidly. Bactericidal action of the maternal milk no doubt assists this disappearance.

4. In young that have died of "cholera" even if the infection have been introduced into the blood circulation there is abundant excretion of vibrios by the bucco-pharyngeal mucous membrane.

5. The normal gastric contents of newly-born rabbits have a high acidity. But, contrary to what is observed in adult and in newly-born guinea-pigs, the acidity in suckling rabbits, infected with vibrios, increases with the onset of the intestinal disease.

6. The gastric juice of newborn and adult rabbits exercises an almost immediate bactericidal action on non-sporulating germs.

. . . . . .

8. In the "cholera" of young rabbits the organs selected by the vibrios are : the caecum and appendix and the colon. The small intestine is always less rich in vibrios if not sterile, which is the rule in the duodenum. Thus we have an entero-colitis and not a true "intestinal cholera."

9. Vibrios introduced into the mouth of the rabbit at the breast do not reach the intestinal walls direct by way of the stomach, but arrive indirectly through general circulation.

10. One may obtain this entero-colitis in newborn rabbits by injecting vibrios under the skin or into the peritoneal cavity.

11. Vibrios given by the mouth to young rabbits are at first absorbed by lymphatics and pass from these by the trunk lymphatics to the general circulation. They first appear in the alimentary canal after about twelve hours and at the level of the ileum, caecum, appendix and colon. Later a few mount into the small intestine but never reach the duodenum.

. . . . . .

13. The intervention of other microbes, such as *B. coli*, increases the gravity of the intestinal disease and may even start it when they have reached a maturity which would ordinarily render them resistant.

14. Such resistance begins about the tenth day and coincides with the first appearance in the blood plasma of the vibrionicide (alexine).

15. Before that time the blood serum of newborn rabbits is very poor in alexin, which explains failure to procure immunity by means of vaccines.

16. The appearance of specific antibodies in the blood of newborn rabbits can only be obtained by vaccinating the mothers during the period of gestation. Rabbits born of such mothers are resistant even to the entero-colitis.

17. The resistance offered by older rabbits is principally due to a reduced permeability of the buccal mucous membrane and a reduced sensibility of the intestinal mucous membrane by which the vibrios are excreted.

18. This is also the reason why guinea-pigs, even young ones, do not suffer from this "intestinal cholera." Guinea-pigs, with a gestation period of at least 60 days (rabbits 30 days) are provided with much more developed organs of digestion.

19. The gastric acidity of newly born guinea-pigs prevents the passage of vibrios or of other non-sporing germs administered by the mouth.

20. Vibrios given to newborn guinea-pigs by the mouth may, however, if only in small numbers, be absorbed by the lymphatics of the mouth and eliminated as customary by the lower segments of the digestive tube.

J. H. T. W.

OTSUBO (I.). [**A Phenomenon presented by Iodine on the Cultivation of Cholera Vibrio.**]—*Saikingaku Zasshi* (*Jl. of Bact.*). 1921. May. No. 308. [Summarized in *Japan Med. World.* Tokyo. 1921. Sept. 15. Vol. 1. No. 5. p. 27.]

The authors added iodine or lugol solution to the medium on which the vibrio was cultivated. The result was that in a short time there appeared a very beautiful ring round the colonies. This ring did not take the stain of iodine. If left for some time the ring disappeared; but reappeared if fresh iodine was added. This phenomenon was positive with 36 cultures of *V. cholerae* as well as with other vibrios. [May be due to reaction on starch in the medium?—See below, KODAMA.]

J. H. T. W.

KODAMA (Toyojiro) & TAKEDA (Eiichi). [**On a New Biological Reaction of Cholera Vibrio.**]—*Eiseigaku Densenbyogaku Zasshi* (*Jl. of Hyg. & Infect. Dis.*). 1921. Sept. Vol. 17. No. 1. [Summarized in *Japan Med. World.* Tokyo. 1922. Jan. 15. Vol. 2. No. 1. pp. 23–24.]

The authors repeated the experiments of OTSUBO with iodine, introduced into culture media for *V. cholerae.* They think that the reaction is due to the production of saccharine ferments.

J. H. T. W.

GILDEMEISTER (E.). **Ueber Variabilitätserscheinungen bei Vibrionen.** [Variability in Appearance of Vibrios.]—*Cent. f. Bakt.* 1. Abt. Orig. 1921. Dec. 5. Vol. 87. No. 4. pp. 241–254. With 11 text figs.

Without the figures this paper will not convey much information. The variation in the appearance of certain colonies of vibrios is due to the culture medium on which they they are grown and to the length of time of growth. It is a paper which might be of use to a working bacteriologist but is not of much importance to medical workers in general.

J. H. T. W.

IITAYO (Katsusaburo). [**On the Application [Use ?] of Fish Broth for the Demonstration of** *Vibrio cholerae.*]—*Saikingaku Zasshi* (*Jl. of Bact.*). 1921. Aug. No. 311. [Summarized in *Japan Med. World.* Tokyo. 1922. Jan. 15. Vol. 2. No. 1. p. 17.]

The author prepared a fish broth by boiling 50·0 gm. of fish in 1 litre of water containing 5·0 gm. of salt. In the medium thus obtained *V. cholerae* grew vigorously; while saprophytes did not grow at all.

J. H. T. W.

KODAMA (Toyojiro). [**On a New Specific Medium for** *Vibrio cholerae.*] —*Eiseigaku Densenbyogaku Zasshi* (*Jl. of Hyg. & Infect. Dis.*). 1921. Sept. Vol. 17. No. 1. [Summarized in *Japan Med. World.* Tokyo. 1922. Jan. 15. Vol. 2. No. 1. p. 24.]

Kodama gives three media based on the colour reaction of *V. cholerae* :—

1. Litmus agar with starch :—

3 per cent. neutral agar with Witte's peptone	100·0 cc.
10 per cent. soda water [sic] ..	2·0 cc.
Starch	3·0 gm.
1/60th Litmus water	15·0 cc.

2. Fuchsin agar with starch :—

As in No. 1 with (in place of litmus)—	
Saturated alcoholic solution of Fuchsin	0·1 cc.
20 per cent. sodium sulphite solution	2·5 cc.

3. Fuchsin-cattle-serum-agar :—

Fuchsin agar with starch (as above)	2 parts.
Cattle serum diluted 1·5	1 part.

These are used with the colorimeter.

J. H. T. W.

KRAUS (R.). **Ueber die Verschiedenheit der Eltor- von den Cholera-vibrionen.** [Difference between El Tor and Cholera Vibrios.] —*Muench. Med. Woch.* 1922. Apr. 7. Vol. 69. No. 14. pp. 499–500.

Records results confirming the haemolytic powers of the "El Tor" vibrio. The author, however, unlike most observers, believes that this strain of vibrios gives rise to a special toxin [compare this *Bulletin*, Vol. 16. p. 40 (KABESHIMA); Vol. 18, p. 353 (DOUGLAS)].

J. H. T. W.

BESREDKA (A.). **De la vaccination contre le choléra.**—*Bull. Inst. Pasteur.* 1922. Jan. 15. and Jan. 30. Vol. 20. Nos. 1 and 2. pp. 1–8; 41–51.

The author points out that anticholera vaccination has not received the attention to which it is entitled because its protective power is at present of short duration and it cannot fully be demonstrated by laboratory experiments. Those who have worked during cholera epidemics, however, know the value of the vaccine [see this *Bulletin*, Vol. 17, p. 403 (SIERAKOWSKI); p. 406 (FURUTAMA & TEAGUE)]. Besredka gives the history of the discovery of *V. cholerae* in 1884 and of FERRAN's unhappy use of a vaccine in 1885, the experiments of HAFFKINE, ROUX & YERSIN by which a fixed virus and a controlling attenuated vaccine were arrived at and notes HAFFKINE's voyage to India in 1903 to make trial of the new vaccine. In all the vaccines above mentioned live vibrios were found. Next came the vaccine of GAMALÉIA in which vibrios had been heated at 120°. This vaccine protected guinea-pigs against living *V. cholerae*. Then followed the anticholera vaccine prepared by BRIEGER, KITASATO and WASSERMANN and exposed to 60° C. for a quarter of an hour. In 1902 sensitized vaccines were announced as conferring protection on animals. From that year to 1918 there was no advance, but in 1918 SHIGA, TAKANO and S. IABE reported that antibodies appeared more rapidly when a sensitized vaccine was used. At the request of the author, Dr. MASAKI undertook some experiments with a vaccine containing living sensitized vibrios. He showed that if non-sensitized vibrios, 1/50 of a culture, killed a guinea-pig when injected into the peritoneal cavity it required an entire culture, often more, after the vibrios were sensitized. Moreover, when injection of 2–3 cultures of sensitized vibrios caused the death of a guinea-pig no vibrios could be cultivated from the intestinal contents. Death was due to local peritonitis with, possibly, general shock due to liberation of endo-toxin.

J. H. T. W.

MASAKI (S.). **Du vaccin anticholérique sensibilisé vivant.** – *Ann. Inst. Pasteur.* 1922. Mar. Vol. 36. No. 3. pp. 273–286.

The author refers to the work of BESREDKA, who first suggested the "sensitized" vaccine. He then describes his method of preparing the vaccine used in these experiments on guinea-pigs; anticholera serum of a titre of 1–6000 is diluted by one fourth physiological saline solution; 4 cc. of this diluted serum is added to an agar tube culture of *V. cholerae* 24 hours old. The mixture is :—(1) placed in the incubator at 37°; (2) left at laboratory temperature 15° to 20°.

1. Sensitization reduces the vitality of the vibrios. Those sown on agar at the end of 24 hours show a vitality diminished by half as compared with the original culture; at the end of 48 hours there is often no growth.

2. At laboratory temperature sub-cultures are positive at the end of 48 hours; but the number of colonies obtained is smaller.

As a test of virulence four vaccines were used:—

i. left in incubator 24 hours.
ii. ,, ,, 3 ,,
iii. ,, at laboratory temperature 24 hours.
iv. ,, ,, ,, 6 ,,

A guinea-pig inoculated with one tube of No. iv on May 1 died on May 4; 1·5 tubes produced the same effect, while a guinea-pig inoculated with two tubes of the sensitized No. iv died on May 2.

Guinea-pigs (weight 390–400 gm.) inoculated subcutaneously or intraperitoneally with similar doses of vaccines i, ii and iii survived. Thus is it seen that sensitization reduces the virulence.

Conclusions:—(1) Sensitization with anticholera serum produces weakened vitality in the vibrios, and if the mixture is left too long in the incubator they die. The most favourable temperature is 37°. (2) With the reduced vitality there is of course reduced virulence in the vaccine. (4) This sensitized vaccine confers on the animals a rapid and durable immunity.

J. H. T. W.

MASAKI (S.). **Du mécanisme de l'infection cholérique et de la vaccination contre le choléra par voie buccale.**—*C. R. Soc. Biol.* 1922. Mar. 11. Vol. 86. No. 10. pp. 532–534.

Professor Masaki very rightly points out that the injection of lethal doses of vibrios into the peritoneal cavity or subcutaneously in experiments with guinea-pigs is not following the normal method of infection with cholera virus. Death really occurs from peritonitis or general septicaemia. This can be proved by examination of all organs immediately after death. He gives two examples:—

1. Guinea-pig No. 80, weight 400 gm.:—On March 16, at 6 p.m., it received in the peritoneum 1/40 of an agar culture of vibrios. It died at 5 p.m. on the 17th. Inoculations from the peritoneal fluid, the blood, bile and urine were negative; contents of small intestine gave numerous colonies of *V. cholerae* and very rare colonies of *B. coli*; contents of large intestine gave numerous colonies of *V. cholerae* and of *B. coli*.

2. Guinea-pig No. 95, weight 390 gm.:—Received on March 30 a sub-cutaneous injection of an entire agar culture of cholera vibrios at 8 a.m. It died at 7 p.m. The serum taken from the subcutaneous area gave a pure culture of *V. cholerae*. Blood, bile and peritoneal fluid sterile. Contents of small intestine at different levels gave numerous colonies of *V. cholerae*. Contents of large gut gave numerous colonies sprinkled with colonies of *B. coli*. [This is what one would expect; see this *Bulletin*, Vol. 18, p. 73.]

Living vibrios may be given in enormous numbers by the mouth to rabbits with no untoward results, but if the animals have first been "sensitized" by bile given by the mouth, the author finds that antibodies are formed and animals so sensitized will survive intravenous injection of a lethal dose of living *V. cholerae*. The author concludes

that the rabbits have thus been actively vaccinated by way of the mouth, since no trace of immunity or of antibody is found after repeated doses of vibrios living or dead without sensitization.

J. H. T. W.

i. LESAGE (A.). **Le choléra infantile et les mouches. Son isolement en pavillon spécial.**—*Bull. Acad. Méd.* 1921. Nov. 15. Vol. 86. No. 37. pp. 267–268.

ii. OHYAMA (Hishiichi). [**On Saccarification and Red Reaction of** *Vibrio cholerae.*]—*Eiseigaku Densenbyogaku Zasshi* (*Jl. of Hyg. & Infect. Dis.*). 1921. Sept. Vol. 17. No. 1. [Summarized in *Japan Med. World.* Tokyo. 1922. Jan. 15. Vol. 2. No. 1. p. 24.]

iii. WATANABE (Yoshimasa), KAWAI (Jitujin) & WATANABE (Hotori). [**On the Strain of** *Vibrio cholerae* **isolated from the Cases of Cholera occurring during the Epidemic which prevailed in Kanagawa and Tokyo Prefectures in 1921.**]—*Saikingaku Zasshi* (*Jl. of Bact.*). 1921. Aug. No. 311. [Summarized in *Japan Med. World.* Tokyo. 1922. Jan. 15. Vol. 2. No. 1. pp. 16–17.]

iv. YAMAMOTO (R.). [**A Therapeutic Experiment of Cholera.**]—*Osaka Igakkwai Zasshi* (*Jl. of Osaka Med. Soc.*). 1921. Jan. Vol. 20. No. 1. [Summarized in *Japan Med. World.* Tokyo. 1921. May 15. Vol. 1. No. 1. p. 23.]

v. WATANABE (Yoshimasa), KAWATANI (Makoto) & WATANABE (Hotori). **Ueber die Beziehung der im Jahr 1920 geherrschten Cholerastämme und den El Tor-Vibrionen.** [Cholera Strains and El Tor Vibrios in Japan during 1920.]—*Kitasato Arch. Experim. Med.* 1921. Vol. 4. No. 3. pp. 281–298.

i. Contains nothing new. Traces infection to flies through food.

ii. The author finds that *V. cholerae* and other vibrios show a more marked colour reaction in culture media containing starch.

iii. Five strains were isolated from carriers in June, 1921. There was nothing abnormal on culture. They resembled those found during the 1920 epidemics [see this *Bulletin*, Vol. 17, p. 406.]

iv. Records the well-known value of bicarbonate of soda with the hypertonic salt solution in severe cases of cholera.

v. The substance of this paper has already been noticed over the signature of Hiroshi OHSHIMA [this *Bulletin*, Vol. 17, pp. 405–406], and also in the Sectional Editor's "Review," Vol. 18, p. 72.

J. H. T. W.

POTTEVIN. **Le diagnostic bactériologique du choléra.** *Bull. de l'Administration sanitaire des Frontières.* 1921. Dec. 20; & 1922. Jan. 5 & 20. Nos. 6, 7 & 8. pp. 89–98; 112–123; 137–147.

WALKER (R. R.). **Kaolin in the Treatment of Asiatic Cholera: Its Action and Uses.**—*Proc. Roy. Soc. Med.*(Sect. of Therap. & Pharmacol.). 1921. Oct. Vol. 14. No. 12. pp. 23–29.

ENTERIC FEVERS IN THE TROPICS.

FLETCHER (William). **Incubation and Contact Carriers of Enteric Fever.**—*Studies from the Inst. for Med. Res., Federated Malay States.* 1921. Kuala Lumpur; F.M.S. Govt. Printing Office. 9 pp. With 6 charts.

"A," "B," "C," carriers of dysentery bacilli, and "D," a paratyphoid carrier, were under treatment for elimination of the respective germs. An acid-forming streptococcus was inoculated into gruel made of yeast and oatmeal and this gruel (after 24 hours' incubation) was given to the four men three times a day. The excreta were examined daily. "D," the paratyphoid carrier, was unfortunately permitted to assist in the preparation of the gruel. Treatment began on April 3, and ten days later *B. paratyphosus* B appeared in the stools of "A"; he passed through an attack of paratyphoid B fever. The bacillus was not found in his blood, but agglutinins were present. The men "B" and "C" were similarly infected from the contaminated gruel. The three recovered and the bacillus B disappeared. [It is evident that the acid-producing streptococcus was not able to reduce the virulence of the *B. paratyphosus* B either in the gruel or in the intestines. The question of carriers has been carefully considered in India and elsewhere; see this *Bulletin*, Index Vols., 1915, and onwards: HARVEY (D.); SEMPLE (D.); GREIG (E. D. W.), etc.]

J. H. Tull Walsh.

THOMPSON (T. O.). **Notes on a Cutaneous Reaction for the Possible Diagnosis of Enteric Group Carriers—Enteric and Dysentery Convalescent Depot, Wellington.**—*Jl. Roy. Army Med. Corps.* 1921. Oct. Vol. 37. No. 4. pp. 302–311.

Captain Thompson, R.A.M.C., attracted by the "Typhoidin" test as used by GAY and FORCE [see this *Bulletin*, Vol. 11, p. 452], has carried out a small series of experiments on suspected carriers. The patients showed no local skin reaction to "a serum possessing high amounts of antibodies" to bacilli of the "enterica" group. Carriers did, however, show distinct local reaction "to toxins of dead cultures of a mixture of enteric group organisms." Controls were submitted to the same applications. Finally an ordinary "T.A.B." vaccine was used. The control solution for suspected cases was a sterilized normal saline solution. The reaction was noted every 24 hours until it finally disappeared:—(1) "Full red reaction with raised surface and oedema of area round"; (2) "Full red reaction extending beyond the area of scarification"; (3) "Red area of scarification"; (4) "No reaction beyond scratch marks." These remarks as they occurred are set down in the "Table" pp. 304–309.

The author concludes that: "The reactions and findings of this experiment taken as a whole are apparently reliable and satisfactory" as a quick test for the presence of one or other of the "enterica" group.

J. H. T. W.

SARRAILHÉ (A.). **Fièvre typhoïde et vaccinothérapie digestive.**—*Bull. Soc. Méd.-Chirurg. Indochine.* 1921. July. Vol. 12. No. 1. pp. 54–61. With 1 chart.

The author refers to the usual method of anti-enteric vaccination and seems to think that better methods might be found. Though extremely valuable the immunity is only for a year or so, and the anti-typhoid vaccines are not of much use in treatment. He describes, with full details, a case of typhoid treated with a vaccine given by the mouth. The vaccine contained T. A and B; about 1,000 millions of each per cc. The case was first seen by Dr. Sarrailhé on October 18, fourteen days after the commencement of the illness, and the first 60 cc. in three doses, at two-hour intervals, was given by the mouth on October 24. "Towards evening the symptoms improved. The patient became quiet and fell into deep sleep for two hours (from 6–8 p.m.). On awaking the patient's mind was clear, he asked for a drink and passed urine freely." The temperature sank from 39° C. to 38·7° C. On the 25th the temperature remained at 38·3° C. The doses of vaccine were repeated on that day and again on the 26th. There was a striking improvement in the patient's condition.

J. H. T. W.

ROMERO (N.). **Un cas d'ostéite paratyphique survenu, à la suite d'un traumatisme, chez un homme sain.**—*Bull. Soc. Path. Exot.* 1922. Jan. 11. Vol. 15. No. 1. pp. 5–7.

The author begins his paper with notes on the enterica bacilli in Chile. He points out that typhoid fever is endemic in Santiago. In 1913 there were 274 cases of enteric fever. *B. typhosus* was found in 89 per cent., *B. paratyphosus* A in 10 per cent. and *B. paratyphosus* B in 1·4 per cent. Certain atypical germs were also found.

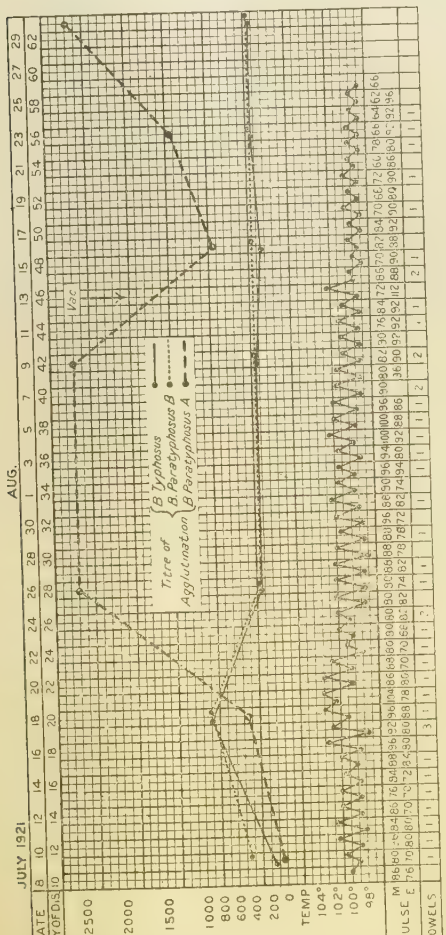
The patient was a man, aged 32, whose forearm had been severely crushed by a door. There was no wound, but marked contusion and great pain. After some days a swelling formed over the bruise. This burst at the end of 15 days, discharging thick creamy pus. A fistula remained with purulent discharge for eight months, at the end of which a bacteriological examination was made. A pure culture of *B. paratyphosus* B was obtained. The patjent's serum agglutinated the bacillus to 1 : 200 [*cf.* this *Bulletin*, GILDEMEISTER (E.), Vol. 11, p. 439].

J. H. T. W.

DIVE (G. H.) and a Note by Lt.-Col. J. C. KENNEDY. **A Case of Paratyphoid A Fever.**—*Jl. Roy. Army Med. Corps.* 1922. Apr. Vol. 38. No. 4. pp. 306–308. With 1 chart in text.

This case is of great interest because it occurred in a young man who had been inoculated with "T.A.B." vaccine in 1916, 1917 and 1918. He left Mesopotamia in June, 1921, and en route developed fever with general pains and malaria. He was admitted to the Queen Alexandra Hospital on July 8; temperature from 101° to 103° F. every evening. On July 11 some doubtful rose spots were noticed.

The stools were normal. As no organism specific of disease could be found diagnosis rested upon serum agglutination tests. These are well shown in the chart.



Graph illustrating Major Dive's Case of Paratyphoid A Fever.

It is remarked by Lt.-Colonel Kennedy that the "A" agglutinins appear to be the least responsive to an infection by another member of the group, and tend to appear later than those for "T" or "B." Hence the rise in "A" agglutinins between July 9 and 18, though the titre reached was only half that of "T" or "B," was regarded as most significant. The subsequent rapid rise of the "A" agglutinins to a high titre compared with the earlier response and subsequent subsidence of "T" and "B," as also the marked fall in "A" agglutinins, and the slight corresponding fall in the "T" curve following a dose of 50 millions paratyphoid "A" vaccine are well shown. The graph affords an interesting comparison between the agglutinin curve produced by a specific ("A") and that produced by a group stimulation ("T" and "B").

[Reproduced by permission from the *Journal of the Royal Army Medical Corps.*]

Treatment consisted of small doses of a pure paratyphoid A vaccine (50 million). Temperature normal on August 13 and convalescence rapid. Lt.-Colonel Kennedy thinks that anti-enterica vaccines have been used in too large doses and that in small doses they are of value in treatment. We know that the protection given for *B. paratyphosus* A only lasts for about six months.

J. H. T. W.

LEPROSY.

ALBERT (José). **The Experiment of Leper Segregation in the Philippines.**—Reprinted from *Jl. Philippine Islands Med. Assoc.* 1921. Vol. 1. pp. 133–143.

Dr. Albert is one of those to whom the system of compulsory isolation of lepers as a means of stamping out the disease makes no appeal. It is clear, throughout the whole course of his paper, that he has watched the Culion Experiment with critical and hostile eyes, and that the results so far reported bring him no evidence of a sort to alter his views. He deals with the subject, however, in a perfectly frank and scientific spirit and sets forth his opinions in a trenchant and effective manner that will be of value in re-opening a much discussed question at a very appropriate moment.

With a view to counteracting the favourable opinions expressed by M. ROSENAU and Sir L. ROGERS on the Culion Leper Colony, Dr. Albert presents the annual admissions of lepers from July, 1906 to May, 1921, in the form of a Table which is here reproduced :—

TABLE I.—Number of Lepers admitted to the Culion Leper Colony.

From July to December, 1906	802
From January to December, 1907	690
From January to December, 1908	1,603
From January to December, 1909	1,378
From January to December, 1910	930
From January to December, 1911	889
From January to December, 1912	964
From January to December, 1913	795
From January to December, 1914	859
From January to December, 1915	555
From January to December, 1916	966
From January to December, 1917	613
From January to December, 1918	973
From January to December, 1919	551
From January to December, 1920	605
From January to May, 1921	381

Assuming that there has been no appreciable change in the population from which these admissions are drawn, it must be admitted that there is no significant reduction yet apparent. In the author's opinion, the Colony itself is very unpopular. "Administered," he says, "with the best of wishes, without sparing any expense to make life in the Colony attractive, the institution has never succeeded in gaining the sympathies of its sick inmates or the approval of the people." This view may be the correct one but, on the other hand, visitors well qualified to form a reliable opinion have been very favourably impressed, and the remarks of Sir Leonard ROGERS, summarized in this *Bulletin*, Vol. 17, p. 288, show that he at least was greatly impressed by the work at Culion. It is true that it is to refute this very expression of opinion by ROGERS that the paper under review is written, but the fact remains that an unbiassed examination of the facts by an acknowledged expert led him to the conclusion that the Colony was a success. We are not desirous of attempting to adjudicate upon the question of the Culion Colony nor do we think that the time is yet ripe to evaluate what is essentially an experiment. In leprosy, in which

the incubation period is often prolonged and in which infection is usually contracted in childhood, it is clear that a long time must elapse before the Culion experiment can be fairly judged as to its effect in eliminating or diminishing the incidence of the disease. On the general question of the value of compulsory segregation of lepers, we are not inclined to be optimistic. In view of the shortcomings in diagnosis that must have existed prior to the modern developments of bacteriology it requires more faith than we have at our command to attribute the disappearance of leprosy from Europe during and after the middle ages to the compulsory segregation of those days. We hold, in the words of ROSENAU, quoted by Albert, that "there are factors in the control of leprosy not yet understood." But the fact that such an experiment as that of the Culion Leper Colony has been undertaken and that it is in the hands of competent persons backed with statutory and financial power to an unprecedented degree should make us very guarded in final expressions of opinion at the present time. Another twenty years and we shall be in a position to *know* whether segregation can or can not get rid of leprosy. In the meantime, it would be a thousand pities if local prejudice or premature conclusions were to deprive science of the fruits of what should prove, if carried through, a conclusive experiment.

S. Lyle Cummins.

MUIR (E.). **The Present Position of Leprosy in India.**—*Indian Med. Gaz.* 1921. Oct. Vol. 56. No. 10. pp. 375–379.

This paper commences with a brief survey of the present position of leprosy in India, which concludes with the opinion that there must be at least 100,000 pauper lepers in the country at the present time, and that there are probably five or ten non-pauper lepers for each of the hundred thousand. Figures like these form a valuable commentary on facile expressions of opinion in favour of a wide extension of compulsory segregation. The most important point to bear in mind is that this disease is especially liable to be contracted in childhood, and this fact is once more brought to notice by Dr. Muir, who says that "children are more especially interested in this disease . . . . about 45 per cent. of children being infected from leprous parents when they remain in contact with them, while only between 2 and 3 per cent. of husbands are infected from leprous wives, or wives from leprous husbands, where they remain together." We cannot help thinking that if only the Grancher system, employed so successfully in France for the avoidance of tuberculous infection in the children of the tuberculous, could be applied in India to the offspring of leper parents, much might be accomplished. Passing on to the question of treatment, Dr. Muir discusses the various methods of administration of the new remedies of the chaulmoogric acid series. His own preference is for the use of E.C.C.O. hypodermically according to the methods already described by him, this *Bulletin*, Vol. 19, p. 265, or, where the intravenous route is to be desired, the method of Dr. P. HARPER of Makogai, who uses chaulmoogra or hydnocarpus oil mixed with sulphuric ether and iodine in the following proportions :—

Chaulmoogra oil	500 m.
Sulphuric ether	500 m.
Iodine	1 gr.

This mixture is clear, and when injected intravenously causes neither capillary embolus nor obstruction of veins. The injections are given daily, at first in doses of 10 minims and then in doses of 20 minims. Coughing may be troublesome and Muir is therefore in the habit of using the tuberculin syringe supplied by Parke, Davies and Co., by which the injection can be given very slowly. The paper concludes with a warning that the time has not yet come to assert that leprosy can be permanently cured by the new drugs, although their great therapeutic activity is already proved beyond question. Time must show whether the disappearance of signs and symptoms under modern treatment is or is not permanent. In the meantime, with a view to clearing up the question of "cure," Dr. Muir is hopeful that "by means of provocative doses of the ethyl esters . . . . given intravenously in comparatively large doses we may be able to induce reactions in lepers which will distinguish them from leprosy-free controls."

S. L. C.

VALVERDE (Belmiro). **Implantação da lepra no Brazil.**—*Ann. Paulist. Med. e Cirurg.* 1921. May & June. Year 9. Vol. 9. No. 5–6. pp. 91–94.

The author finds reason to believe, from his researches into the history of leprosy in Brazil, that this disease was entirely absent when the country was first discovered by Europeans. The health of the aboriginal inhabitants must have been ideally good and such as is characteristic of a simple and primitive type of culture amongst surroundings to which the community has become adapted. The question to which discussion is directed is as to the source of the leprosy which is now endemic. Was it introduced chiefly from Africa with the slaves for the plantations or were the Portuguese colonists themselves responsible for its introduction? Dr. Valverde points out that although the slaves brought to the United States of America must have amounted to at least a million, leprosy never gained an important place in those regions, whereas it has become a formidable element amongst the diseases of the Latin-American countries. He considers that the main responsibility for the introduction of this malady rests on the European colonists, drawn from areas in which, in mediaeval times, leprosy was markedly prevalent. He finds a parallel case in Madeira, where the earliest colonists, criminals banished from their own countries, brought with them the leprosy then so common in Europe and furnished it with the conditions best suited to its continued endemicity.

S. L. C.

HENRY (—). **L'état actuel de la lèpre en Guyane.**—*Rev. Méd. et Hyg. Trop.* 1921. Vol. 13. No. 2. pp. 33–54.

The author draws a lurid picture of the views held by the stay-at-home part of the population of France as to the horrors of leprosy in the tropics; views founded to some extent on travellers' tales and to some extent also on the inherited fear of this disease that still exists in Europe as a legacy from the Middle Ages. At a moment when France has need of her sons to help in developing her colonial possessions, it is regrettable that these exaggerated ideas should obtain credence, and Dr. Henry is opportune with his report on leprosy in French Guinea, where former observers have believed the disease to be terribly

common and unusually severe. It is shown, in the paper under review, that not more than about a hundred lepers exist at the present time in the city and environments of Cayenne, where former statements had claimed numbers varying from 300 (CLARAC) to 1,000 (GUILLON). Evidence at the disposal of the author leads him completely to deny the validity of the assertion frequently made that leprosy, in Cayenne, is common amongst the well-to-do classes. He gives, as the exact figures for Cayenne in 1920 amongst the upper classes, three cases in 116 families. It is particularly among the very poor that the disease is found. His enquiries lead him to the view that infection is usually acquired in childhood.

S. L. C.

VALVERDE (Belmiro). **Transmissibilidade da lepra.**—*Brazil Medico.* 1921. Oct. 8. Year 35. Vol. 2. No. 13. pp. 179–184.

After a general consideration of the evidence for and against the transmission of leprosy by ectoparasites, Dr. Valverde proceeds to discuss in considerable detail the evidence cited by Dr. Adolpho LUTZ in favour of the mosquito as a vector of the germs of this disease. He points out that in the four human diseases known to be transmitted by mosquitoes, filariasis, malaria, yellow fever and dengue, the evidence is clear, definite and experimentally sound. In the case of mosquitoes and leprosy, however, the position is very different; there being a marked lack of experimental support and a tendency to replace it by ingenious speculation. Valverde is completely opposed to LUTZ on this question and regards the evidence for the mosquito as the transmitting agent of leprosy as quite inadequate. He points out the great opportunities for the final solution of this question that are enjoyed by medical men working in Brazil and expresses the hope that the honour of successful research in this direction may fall to his native country.

S. L. C.

SERRA (Alberto). **Lepra e "Demodex folliculorum."**—*Pathologica.* 1921. Aug. 1. Vol. 13. No. 305. pp. 361–368. With 2 text-figs.

Following on the work of BORREL and more especially a recent communication by MAJOCCHI, in which the latter reported the co-existence of Demodex and lepra bacilli in 8 out of 11 cases of leprosy of which the comedones were examined, Professor Serra applied a carefully devised technique to the examination of 58 leprous patients in order to obtain all the information possible on this question. In a tabular statement of his results on page 362 of his report, we find, together with other details, that, in 17 cases of nodular leprosy of which the comedones of the nose, cheeks and forehead were carefully searched, Demodex was found in 10, Demodex together with lepra bacilli in 8; in 16 "mixed" cases, Demodex was present in 11 and both Demodex and bacilli in 5; while out of 25 anaesthetic cases, Demodex was found in 9 and with lepra bacilli in 2 cases. Two microphotographs, showing Demodex and bacilli together in the material expressed from a comedo from a case of leprosy serve to illustrate the text. The majority of "positive" findings of the three elements, comedones, Demodex and lepra bacilli, on the coexistence of which the research was based, were recorded from just those situations

where leprous lesions are most common; the order of frequency being nose, alae nasi, temporal region, superciliary region, chin, front of ear, forehead and suprascapular region..

Attempts to transmit bacilli by means of Demodices from comedones of leprous patients might throw light on the question of whether these results are merely pathological coincidences or connected with the etiology of leprosy; but there are obvious difficulties in such an investigation. The author tried, with material from two "positive" cases of nodular leprosy, to pass on the Demodex and the lepra bacilli to two cases of anaesthetic leprosy in which no infected comedones could be found. One of these cases was lost sight of but, in the other, two months later, small numbers of Demodices and bacilli were found in the sebaceous glands of the ala nasi, on which the sebaceous material from the "positive" cases had been spread. This experiment serves, at least, to show that Demodex can pass from man to man and perhaps carry with it Hansen's bacilli. Attempts to infect dogs, in which an itch caused by an allied Demodex occurs, by the same means led to no conclusive result, nor was any important information obtained from attempts to infect the anterior chamber of the eye of a group of rabbits by means of sebaceous material containing lepra bacilli, though the author had previously shown that the introduction of small portions of leprous tissue into this situation leads to proliferation of the bacilli.

The author discusses the view expressed by MAJOCCHI that the Demodex acts not only as a vector of lepra bacilli but also as an irritant body, setting up a perifollicular inflammation, and facilitating the entry of the bacilli into the surrounding tissues, but thinks that the histological appearances of lepromata are against the hypothesis of a perifollicular origin. It is more likely that, as a result of the irritation set up by the Demodex, motile connective tissue cells carry the bacilli through the wall of the follicle into the surrounding tissues. In conclusion, while regarding the question of the possible rôle of *Demodex folliculorum* as a carrier of leprosy as still unsettled, the author considers that the evidence is sufficient to justify extensive research.

S. L. C.

NOËL (P.). **Menstruation et fécondité dans la lèpre.**—*Ann. Dermat. et Syph.* 1921. Oct. 6th Ser. Vol. 2. No. 10. pp. 396–400.

This valuable though brief paper puts to the test of actual observation the much debated question whether leprosy has any marked effect in interfering with the functions of the female genital organs.

The author, having under his care at the Leper Asylum of Yaounde, in the Cameroons, about 400 patients of whom 183 are females, decided to investigate this problem. Setting aside 16 cases too young to have yet menstruated, there remain 167 women and girls of whom 146 suffer from the anaesthetic, 9 from the nodular and 10 from the mixed form of the disease.

His conclusions are as follows:—

1. Menstruation is not modified by leprous infection, appearing regularly, and continuing in a normal manner until the menopause.

2. Allowing for such circumstances as a repulsive appearance due to the disease, lessened opportunities of impregnation and the admitted frequency of leprous orchitis in the infected males with whom alone, for the most part, cohabitation is possible after manifest infection, there is no notable diminution of fecundity as a result of this disease.

S. L. C.

MATTOS (Belfort). **Manifestações corneanas da lepra.**—*Bol. Soc. Med. e Cirurg. de S. Paulo.* 1921. May. Vol. 4. Ser. 2. No. 3. pp. 68–72.

This is an excellent account of the corneal changes due to leprous infection, the report being based on the examination, by the author, of the cases under isolation in the Leper Hospital of Guapira. Of 224 patients no less than 77 per cent. suffer from ocular lesions, and this is thought to be an understatement as the facilities for intraocular examinations are not such as to give final results. The corneal lesions in leprosy may result either from direct infection of the corneal tissue by the disease, or from the exposure to drying and dust consequent on the "lagophthalmos" so common in leprosy as the result of scarring and the loss of sensation in the conjunctiva due to leprous disease of nerves. The lesions of the cornea truly leprous in origin are as follows :—

Keratitis parenchymatosa leprosa, or the interstitial form.

Leproma of Cornea, or the hyperplastic form of leprous keratitis. The parenchymatous form, again, may be either of the chronic variety or acute or hyperacute in character. A full account of these various forms, illustrated by short descriptions of typical cases, is given and the original paper should be studied by all those working at the ophthalmological problems of leprosy.

S. L. C.

NEAME (Humphrey). **Case of Leprosy affecting the Conjunctiva and Cornea.**—*Proc. Roy. Soc. Med.* (Sect. of Ophthalm.) 1921. Mar. Vol. 14. No. 5. pp. 16–20. With 1 photograph.

The patient had spent many years both in East Africa and in India. Eight years ago spots appeared on the arms a short time after the cauterization of a swelling on the right forearm. He is now a well-marked case of nodular leprosy, with leonine expression, loss of eyebrows, nasal obstruction and large numbers of lepra bacilli in the nasal discharge. Anaesthesia is relatively ill-marked nor are there any very definitely enlarged nerves.

The eye condition is briefly as follows :—

Lids and surrounding skin are infiltrated, the conjunctiva shows an early nodular condition and sections of an excised portion exhibit very numerous lepra bacilli though but little cellular reaction. The cornea shows a definite haze, seen with the loupe to consist of a fine white stippling. The pupils are small and fixed. Vision is considerably impaired. It is open to question whether there is uveitis or not. Treatment by means of sodium morrhuate intravenously and by injections of sodium gynocardate have been used for some little time, but not long enough to enable any opinion as to their effects to be formed. The author quotes the cases of ocular leprosy reported by Treacher COLLINS in this country and LIE in Norway to illustrate the long period of incubation of the disease.

S. L. C.

CASTEL. **Un cas de lèpre à Roubaix.**—*Bull. Soc. française de Dermat. et Syph.* 1921. 28th Year. No. 1. pp. 23–24. With 2 figs.

The author describes a case of nodular leprosy arising, during his residence at Roubaix, in a Frenchman aged 36 years, who had passed five years of penal servitude abroad at St. Laurent, the Iles du Salut, Cayenne and Martinique. Prior to the appearance of the disease, the

patient had lived in close association with groups of the labouring population of Roubaix and had cohabited with a woman for four years. The author indicates the ease with which this disease might implant itself in circumstances such as these, and raises the question as to what the attitude of the medical man ought to be with regard to the associates of such a case in view of the long incubation period of leprosy.

S. L. C.

GOUGEROT & RUPPE. **Lèpre neutrotrope : Lèpre familiale nerveuse "pseudo-vitiligineuse."**—*Bull. Soc. française de Dermat. et Syph.* 1921. No. 8. pp. 398–400.

This note records a case of leprosy treated in France but contracted in Tahiti. The family history is remarkable, the father being at present in a Leper Hospital in Tahiti, one brother being dead of the disease, while another brother and a sister have also contracted leprosy ; and the patient now under consideration has a son, aged 14, who shows a form of the disease almost exactly similar to that of his father. All the cases in this family have had the maculo-anaesthetic form, and the authors are inclined to find in this fact an indication that there may be a specially differentiated type of leprosy bacillus with a "neurotropic" tendency, just as there is said to be a neurotropic treponema slightly different from the *Treponema pallidum*. This is an interesting line of speculation, but there is much reason to think that there may be other factors, such as a certain degree of acquired immunity to explain the nerve type of leprosy, and it would be unwise to draw conclusions from an observation based on one family group. The history, however, is a most striking one and may be commended to those who have doubts about the infectivity of leprosy.

S. L. C.

REPORT OF THE PHILIPPINE HEALTH SERVICE FOR THE FISCAL YEAR FROM JANUARY 1 TO DECEMBER 31, 1920. [Vicente de JESÚS, Director of Health.]—497 pp. With 9 folding charts & 19 plates. 1921. Manila: Bureau of Printing.—Modern Treatment of Leprosy. (pp. 41–55.)

On May 3, 1920, a Leprosy Investigation Committee was appointed by the Director of Health of the Philippine Health Service, and it is the work of this Committee that is summarized in the pages under review. Seventy-six patients were selected from the patients at San Lazero, cases with active lesions being taken irrespective of the duration or extent of the lesion. The entire 76 were divided by the Committee into five groups in such a way that those below 15 years, those between 16 and 40 and those above 40 years were equally divided among the five groups. Five preparations were used, one being employed for each group. These five preparations were as follows :—

1. Sodium gynocardate "A" (the hydnocarpate of ROGERS).
2. Sodium gynocardate "S" the sodium salts of the fatty acids of chaulmoogra oil.
3. Sodium morrhuate, the sodium salts of the total fatty acids of cod liver oil.
4. Chaulmoogra emulsion "S" (or Collobiasis substitute) ; an emulsion containing chaulmoogra oil and acacia.
5. Mercado mixture, of which the formula is :—Camphorated oil 10 per cent., and chaulmoogra oil, āā 60 cc., resorcine 4 gms., purified ether, 2·5 cc.

The first three preparations were given by the intravenous route, the last two by the intramuscular or the subdermal, while in some cases these methods were combined. The first three were given in doses starting with 0·5 cc. and increasing by 0·5 cc. at a time up to 12 cc. (morrhuate) or 15 cc. (gynocardate "A" and "S"). The Collobiasis was given, as a rule, in 2 cc. doses, while the Mercado mixture, from an initial dose of 0·5 cc. was raised to a maximum of 8 cc.

Of these preparations, gynocardate "A" was found to give the least severe reactions and to lead to the best results, 86 per cent. of the cases showing some degree of improvement. The gynocardate "S" gave but little constitutional reaction, but at times led to considerable pain during injection; 60 per cent. of cases were more or less improved. Sodium morrhuate, as noted elsewhere, was found in the Philippines also to give rise to frequent thrombosis of veins. It gave 75 per cent. of improvements, whereas the Mercado mixture, by far the most painful both in its immediate and remote effects, led to improvement in 64 per cent. of the cases treated. The chaulmoogra emulsion, while giving rise to very little reaction, only led to 38 per cent. of improvements. In its recommendations, the Committee makes the following suggestions :—

"1. That one or more of the above methods of treatment be made available for all the segregated lepers in the Philippine Islands.

"2. That the present investigation be continued on a larger scale with a view to further improving the methods of treatment.

"3. That a Board or Committee be created with ample powers and facilities to carry on this work."

S. L. C.

HARPER (Philip). **Progress Report on the Treatment of Leprosy by the Intravenous Injection of Chaulmoogra Oil.**—*Jl. Trop. Med. & Hyg.* 1922. Jan. 2. Vol. 25. No. 1. pp. 2–4. With 1 plate.

This paper reports on the treatment of over 200 cases of leprosy by intravenous injections of chaulmoogra oil at Makogai Asylum, Fiji. Over 26,000 injections have been given since the treatment was started, without serious ill-effects, though two subcutaneous abscesses attributed to faulty technique have been recorded.

There are some interesting remarks of the "treatment reaction" which is frequently observed, may last as long as three weeks, and is followed by rapid improvement; and the appearances "before and after" this reaction are illustrated by two photographs. Of 38 cases included in a list forming part of this paper, 28, or over 70 per cent., improved, one died of influenza, three got appreciably worse and in six cases no change could be observed.

S. L. C.

HOLLMANN (Harry T.). **The Fatty Acids of Chaulmoogra Oil in the Treatment of Leprosy and Other Diseases.**—*Arch. Dermat. & Syph.* 1922. Jan. Vol. 5. No. 1. pp. 94–101.

After a useful summary of previous work on the use of oil of chaulmoogra in various preparations permitting of its subcutaneous inoculation, Dr. Hollmann describes his own initial work and the methods devised, in co-operation with him, by Miss Alice BALL, an instructress in chemistry at the College of Hawaii, of obtaining the active agents

of chaulmoogra oil. The problem was solved by the successful production of the ethyl esters of the fatty acids concerned. The process used by Miss BALL results in the separation of four fractions as follows :—

(*a*) Ethyl ester of chaulmoogra oil.

(*b*) Ethyl esters of acids crystallizing from alcohol with chaulmoogric acid in the initial separation.

(*c*) Ethyl esters of acids soluble in 92 per cent. alcohol in first separation and which form ether-soluble lead salts.

(*d*) Ethyl esters of acids forming lead salts insoluble in ether.

Mention is made of the results obtained by ROGERS and by MUIR with sodium morrhuate, as well as of the observations of NEVE with this latter preparation.

An important fact, noted by NEVE as well as by Hollmann, is that some of the cases show what might be thought to be a fresh manifestation of the disease while under treatment. This, in the opinion of Hollmann, is not a fresh manifestation of the disease but "an inflammatory reaction in previously unrecognized foci of the disease."

In the hands of Dr. Hollman, treatment with the ethyl esters has led 84 patients under his care at Kalihi Hospital to become bacteriologically negative and free from all lesions of the disease. The period of treatment in these cases has varied from four years to three months; 76 per cent. of the patients were under treatment from 6 months to 2 years. No less than 60 of these 84 patients had nodular leprosy. Of the total, 21 were incipient cases, 40 moderately advanced and 23 advanced cases of the disease.

Two patients suffering from pulmonary tuberculosis and two lupus cases were treated by means of the ethyl esters, the results being strikingly good in one of the lung cases and in both the cases of lupus.

A very clear and lucid description of the technique used by Miss BALL for the preparation of the ethyl esters of chaulmoogra oil is given and should be read in the original.

S. L. C.

MARCHOUX (E.). **Traitement de la lèpre par les savons d'huile de foie de morue et d'huile de chaulmoogra.**—*Bull. Soc. Path. Exot.* 1921. Nov. 9. Vol. 14. No. 9. pp. 520–523.

This brief paper sounds a doubtful note as to the efficacy of the salts of the unsaturated fatty acids of chaulmoogra oil in leprosy. So universal has been the agreement as to the beneficial effects of these preparations that it is almost with a sense of relief that we turn to a paper that preserves a critical attitude. Marchoux, with E. FOURNEAU, during 1913-14, had tried the gynocardate of soda, sufficiently thinned to be injectable without much pain, in two cases of leprosy; and had even experimented with the ethyl esters of these fatty acids given by the mouth. These trials led to no results of value and were abandoned on the author's hearing that the products of *Gynocardia odorata* were of low efficiency and only those of *Taraktogenus kurzii* of real use. Later, on the publication of the work of L. ROGERS and others, the experiments were resumed both with a sodium morrhuate and a sodium gynocardate prepared by E. FOURNEAU and afterwards with preparations sent from India by Sir Leonard ROGERS himself. Four cases were treated by intravenous injections with a dosage similar to that employed by ROGERS. On two occasions only were intramuscular inoculations tried, but these

caused much pain and were abandoned forthwith. All the cases treated showed considerable focal reaction. In none was any benefit noted. To control these observations by animal tests the treatment was tried in "rat-leprosy" caused by intraperitoneal injection of cultures; but here again, the drugs seemed merely to aggravate the symptoms, not to lead to their amelioration.

We are not inclined to regard this work of M. Marchoux as sufficiently extended to justify conclusions adverse to the new remedies. The treatment was only continued for about five months—a period that may often have to be exceeded to obtain favourable results. Again, it seems that the dosage was either maintained or increased during this treatment, in spite of marked focal reactions; but many physicians would have thought it advisable to diminish the quantities under these circumstances. As for the "rat-leprosy" experiments, the rapid and acute infection determined by intraperitoneal injection of living bacilli is not perhaps quite comparable with the slow processes of incubation and gradual invasion of leprosy in man; and the latter may be accompanied by some degree of acquired resistance, making cure more probable under appropriate treatment. We like the critical attitude of M. Marchoux and, while venturing to doubt the finality of the rat experiments, we welcome the attempt to try out the new preparations by animal tests. But much more work is necessary before these results can be seriously held to detract from the almost unanimously favourable reports of those who have treated large numbers of patients with the fatty acid derivatives of chaulmoogra oil.

S. L. C.

WILDISH (G. H.). **Antimony in Leprosy.**—*Brit. Med. Jl.* 1922. Jan. 14. pp. 55.

Dr. Wildish, at the Amatikulu Leper Institution, Zululand, treated 20 of the worst cases, "mostly cripples who were housed in the central hospital while awaiting death," with oscol stibium as advised by CAWSTON (see this *Bulletin*, Vol. 17, p. 284; Vol. 18, p. 405). The drug was given intramuscularly in doses of 2·5 cc., 3 cc., and 6 cc. on consecutive days. Three weeks later, 4·5 cc. and 6 cc. were given on consecutive days; and this was repeated during the next two months. Only one patient failed to respond. The beneficial effects were marked, including relief of paralysis, drying of ulcers and better general condition. Even the Zulus, who dislike injections, think the treatment beneficial and ask for more. The oscol stibium treatment combines well with that by the ethyl esters of chaulmoogra oil. Six cases are quoted in detail. Over 1,000 injections have been given in a period of six months, without mishap.

S. L. C.

ARCHIBALD (R. G.). **Notes on a Case of Tubercular Leprosy treated by Intravenous Injections of Stibenyl.**—*Jl. Trop. Med. & Hyg.* 1921. Nov. 1. Vol. 24. No. 21. pp. 277–278. With 1 plate.

Having had a previous opportunity of witnessing a promising result from the use of intravenous injections of colloidal antimony sulphide in a leper, though the case could not be followed up, Major Archibald decided to treat by means of stibenyl, the sodium salt of *p*-acetylaminophenylstibinic acid, a case of nodular leprosy in a Sudanese patient aged 40 who had had the disease for four or five years, and in

whom the diagnosis had been confirmed by the finding of lepra bacilli in smears from the lepromata and the nasal mucous membrane. Four courses were given, each of six injections on alternate days, each course being separated from the next by an interval of 14 days. The dosage in the successive injections was 0·15, 0·2, 0·4, 0·5, and 0·6 gm. of the drug, given as a 1 per cent. solution in sterile normal salt solution or water. The author noted marked improvement in the lesions, a tendency to the substitution of coccal and beaded forms for the bacillary forms at first noted in smears, and a great improvement in the voice, which had been raucous from leprous laryngitis. He regards the results as more striking than any obtained by him with sodium gynocardate and advocates a trial of the drug in early cases.

S. L. C.

WAYSON (James T.). **Use of** *Aleurites triloba* **or** *Aleurites moluccana* **in the Treatment of Leprosy.** [Correspondence.] – *Arch. Dermat. & Syph.* 1921. Dec. Vol. 4. No. 6. p. 818.

In a short letter to the editor, Dr. Wayson suggests that the fatty acid derivatives of the oil of *A. trilobata* or *A. moluccana* may prove of great value in the treatment of leprosy. Commonly known as the Kukui tree, the Aleurites is widely distributed throughout Polynesia, the Philippines and India. The author has succeeded in combining fatty acids of this group with iodine and has great hopes of the future utility of this preparation.

Experimental work on these lines in the treatment of leprosy will be awaited with interest.

S. L. C.

TUBERCULOSIS IN THE TROPICS.

UNION OF SOUTH AFRICA. Department of Mines and Industries. **Reports of the Miners' Phthisis Board for the Period 1st August, 1919, to 31st March, 1920, and of the Miners' Phthisis Medical Bureau for the Year ended 31st July, 1920, together with the Report of the Controller and Auditor-General for the Former Period.** 1921. 92 pp. Cape Town: Govt. Printers. [Price 7*s.* 6*d.*] [U.G. 38–'21.]

For the portion of these communications bearing upon tuberculosis in the tropics, we turn to the Report upon the work of the Miners' Phthisis Medical Bureau (pp. 26–77) in which Dr. W. WATKINS-PITCHFORD (Chairman) deals with the examinations of native labourers and non-European miners. Here we find, set forth in tabular form, the results of careful observations on native labourers from 1916–17 to 1919–20, so far as regards "pure" tuberculosis, "pure" silicosis and "tuberculosis with silicosis."

EXAMINATIONS OF NATIVE LABOURERS.

	1916–17.	1917–18.	1918–19.	1919–20.
Average number of all native labourers	191,202	180,415	171,959	178,571
Approximately average number employed underground	151,814	131,181	129,480	134,591
Number examined by Bureau ..	1,746	1,501	1,495	1,999
Percentage of underground complement examined	(1·15)	(1·14)	(1·15)	(1·48)
Number and percentage found free from compensatable disease ..	300 (17·18)	292 (19·45)	281 (18·8)	685 (34·26)
"Pure" Tuberculosis.				
Number of cases	1,103	946	789	794
Percentage of examinees	(63·17)	(63·02)	(52·77)	(39·72)
Prevalence-rate, per 100,000 of all native labourers	(576)	(524)	(458)	(444)
"Pure" Silicosis.				
Number of cases	91	31	47	126
Percentage of examinees	(5·21)	(2·06)	(3·14)	(6·3)
Ante-primary stage	—	—	—	74
Primary stage	84	31	44	50
Secondary stage	7	0	3	2
Prevalence-rate (1y. and 2y. stage), per 100,000 of all native labourers	(47)	(17)	(27)	(29)
Tuberculosis with Silicosis.				
Number of cases	252	232	378	394
Percentage of examinees	(14·43)	(15·45)	(25·28)	(19·7)
Ante-primary stage	—	—	—	37
Primary stage	83	32	63	89
Secondary stage	169	200	315	268
Prevalence-rate, per 100,000 of all native labourers	(131)	(128)	(219)	(220)

It will be noted that there has been a steady fall in the total numbers of cases and in the percentage of examinees found to be suffering from "pure" tuberculosis while, as pointed out by Dr. Watkins-Pitchford,

this fall has not been arrested by the additional scrutiny entailed by the final examination introduced by the 1919 Act.

A highly interesting record, since it is based on careful post-mortem investigation, is found in Schedule IV of the statistical portion of the Report, in which are set forth the pathological findings of lungs and sputum in miners and in natives respectively during a period of one year. This schedule is here reproduced on account of the contrast which it presents between the findings in Europeans and natives.

SUMMARY OF RESULTS OF PATHOLOGICAL EXAMINATIONS OF LUNGS AND SPUTUM.
(*August 1, 1919, to July 31, 1920.*)

Lungs.

Changes present.*	Miners.	Natives.	Totals.
Silicosis alone	19	4	23
Silicosis with tuberculosis	23	170	193
Silicosis with lobar pneumonia	6	1	7
Silicosis with tuberculosis and lobar pneumonia	2	17	19
Silicosis with influenzal pneumonia.. ..	9	1	10
Silicosis, tuberculosis, and influenzal pneumonia	4	18	22
Silicosis with empyema	1	—	1
Silicosis with tuberculosis and empyema ..	1	—	1
Silicosis with abscess	1	—	1
Tuberculosis alone	3	100	103
Tuberculosis with lobar pneumonia ..	1	12	13
Tuberculosis with influenzal pneumonia ..	—	2	2
Tuberculosis with lobar pneumonia and pleurisy	—	1	1
Lobar pneumonia alone	2	14	16
Pleurisy	—	6	6
Influenzal pneumonia alone	6	11	17
Empyema	1	—	1
Gangrene	—	2	2
Secondary cancer	1	—	1
No signs of disease	15	30	45
Totals (Pairs of lungs) ..	95	389	484

* This is not, of course, identical with "cause of death"; in many instances death had been due to causes entirely unconnected with silicosis.

Sputum.

Source.	Number of Specimens.†	*B. tuberculosis* present.		*B. tuberculosis* not found.
			Percentage	
Miners and European mine employees	980	105	(10·71)	875
Native mine labourers	483	125	(25·87)	358
Totals ..	1,463	230	(15·72)	1,233

† More than one specimen was frequently received from the same individual when the first result had proved negative.

While 19 out of 95 pairs of lungs from miners, or 20 per cent., showed silicosis alone, only 4 out of 389 pairs of lungs from natives, or just over 1 per cent., exhibited this condition. On the other hand, the percentage of natives with pure tuberculosis and with tuberculosis coexisting with silicosis is very much higher than that among the miners. In view of this we infer, though it is not stated in the report, that the natives die too soon from, or are too early infected with, tuberculosis to allow of many surviving long enough to enable pure silicosis to reach its final stages. The fact that no less than 25·87 per cent. of the sputa submitted for examination from native mine labourers proved to be positive speaks for itself. The greater part of the report deals not with tropical but with industrial tuberculosis so is not summarized in this notice; but we strongly recommend all those interested in the effects of inorganic dusts upon the lungs to consult the original report, which constitutes a most important contribution to the subject. Dr. Watkins-Pitchford and his colleagues on the Staff of the Medical Bureau are to be congratulated upon a communication which throws much light upon the problems of tuberculosis and silicosis, and which demonstrates the admirable results that may follow well organized and skilfully executed team-work.

S. Lyle Cummins.

WATKINS-PITCHFORD, IRVINE (L. G.) & SMITH (J. M.). **[Discussion upon Silicosis and Tuberculosis in Native Mine Labourers.]**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1921. Sept. Vol. 1. No. 6. pp. 1–15.

This very important communication on the subject of miners' phthisis resulted from an invitation by the President of the Transvaal Mine Medical Officers' Association to the Chairman and Members of the Miners' Phthisis Bureau to introduce a discussion upon silicosis and tuberculosis. Dr. Watkins-Pitchford, in a short preliminary statement, introduced Drs. Irvine and Smith, whose duty it would be to give an account of the views of the members of the Bureau on this subject. He called attention to two matters of considerable importance, as between the Mine Medical Officers and the Bureau, upon which he hoped that fuller co-operation would be of help to both. The first was the providing by the Mine Medical Officer of a brief history of every patient sent to the Bureau Officers for examination; the second, that more attention should be given to the body weight of the natives. The Bureau has found it essential to make systematic reference to standards and to periodical records of body weight. For this purpose it has adopted the standards found applicable by the Medico-Acturial Investigation of the U.S.A. (1912), which represents the averages of over 200,000 observations. In the opinion of Dr. Watkins-Pitchford, these standards are applicable, with considerable accuracy, to the natives under discussion, save that the herbivorous Hindoo must be excluded. He points out, however, that if a wider experience shows that certain tribes or races exhibit appreciable divergence from these standards, it will become possible to work out the error and take it into account in evaluating the observations made. It is the practice of the Bureau to reject as unfit any native who is deficient in weight to the extent of more than one tenth of the standard for his age and height; but, if there is no trace of chronic pulmonary disease, the rejection is only temporary. Thus, if the standard weight

of a man 5 ft. 8 in. high and aged 30 years is 152 lb., he must not fall short of this by more than 15·2 lb. As this method of standardization is likely to be of service to medical men working in the tropics, the table of Body Weight in Health is reproduced in this *Bulletin* as given by Dr. Watkins-Pitchford.

BODY WEIGHT IN HEALTH.

According to Height and Age.

Height.		20 *years.*	30 *years.*	40 *years.*	50 *years.*
ft.	*in.*	*lb.*	*lb.*	*lb.*	*lb.*
5	0	117	126	131	134
5	1	119	128	133	136
5	2	122	130	135	138
5	3	125	133	138	141
5	4	126	136	141	144
5	5	132	140	145	148
5	6	136	144	149	152
5	7	140	148	153	156
5	8	144	152	158	161
5	9	148	156	163	166
5	10	152	161	168	171
5	11	156	166	174	177
6	0	161	172	180	183
6	1	166	178	186	190
6	2	171	184	193	197
6	3	176	190	200	204
6	4	181	196	206	211

It is to be noted that, while the weight is soon affected in cases complicated or concurrently infected with tuberculosis, silicosis by itself does not lead to any appreciable loss of weight.

The discussion was now opened by the reading of their paper by Drs. Irvine and Smith. This paper treats of the subject under two main headings, the diagnosis of silicosis and the diagnosis of tuberculosis.

I. The Diagnosis of Silicosis :—

The first paragraphs of this part of the paper are devoted to explaining the Miners' Phthisis Act, of 1919. Here we are at once presented with one of those confusions of nomenclature that appear inseparable from Acts and other legal documents drawn up by persons dealing with medical subjects from the purely administrative standpoint. The three legal stages of silicosis are described in the Act as "ante-primary," "primary" and "secondary," which are, in the words of the readers of the paper, best described simply as first, second and third stages. Thus we get such headings as the following appearing in the text: (2) The Second (or Primary) Stage! These obscurities of the Act are not, however, reflected in any want of clearness in the excellent paper by the authors, who contrive to epitomize, in a short communication, the very valuable contribution that is being made to the subject of silicosis and tuberculosis by the investigations of the Bureau.

For these observers, the outstanding pathological features of silicosis are as follows :—

1. It is always a more or less generalized disease.

2. The silicotic fibrosis originates in and around the lymphatic channels of the lungs and pleurae; and is a progressive condition of lymphatic obstruction in the lungs.

3. Probably in direct consequence of this obstruction, the silicotic lung is prone to be attacked by various infections and particularly by tuberculosis.

In the opinion of the authors as well as from the findings of MAVROGORDATO, it is the case that the appearance of extensive areas of fibrotic consolidation, as opposed to distributed fibroses along lymphatic channels, is always a sign of superimposed infection.

The following interesting paragraph serves to bring out the different behaviour of the natives and the European miners in their response to tuberculosis :—

"The association of tuberculosis with silicosis is, of course, very common, especially amongst natives, and may occur at any stage of the latter disease. At the present time it is practically true to say that those who die from the disease die from this complication. In the case of European miners a condition of apparently uncomplicated silicosis usually precedes by a longer or shorter period the appearance of tuberculosis."

A good account of the radiographic and clinical signs of silicosis at its different stages follows and should be studied in the original by those interested in the disease.

II. The Diagnosis of Tuberculosis :—

For the purposes of the Act, a person is deemed to be suffering from tuberculosis when he is found by the Bureau to be :—

(*a*) expectorating the tubercle bacillus ; or
(*b*) to have closed tuberculosis of such a degree as seriously to impair his working capacity *and* to render his removal from underground work advisable in the interests of his health.

Details are given of the grounds on which a diagnosis of tuberculosis is made and it is evident that the Bureau has organized efficient teamwork to this end. European miners suspected to be suffering from this complaint are usually admitted to hospital for a period of observation. The system of investigation of native cases is detailed and appears to be sound in every respect. It is interesting to note that, as elsewhere in Africa, the Members of the Staff of the Bureau call attention to the severity of the disease in these natives. "Pulmonary tuberculosis in the native, at least in our experience, is in most instances a very acute condition." They "are usually acutely ill and in many cases the disease is rapidly fatal. In uncomplicated cases the post-mortem examination nearly always reveals an extensive caseating broncho-pneumonia although in some cases miliary tuberculosis is the form present." A very able paper is closed with the following excellent advice :—"We are convinced that no decision upon a chest, in any but cases of gross change, should be made without the *conjunction* of clinical and radiographic examination."

S. L. C.

DODDS (A. B.). **Detection of Tuberculosis.**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1921. Oct. Vol. 1. No. 7. pp. 1–2. (Discussion pp. 2–6.)

In raising the question of the early detection of tuberculosis Dr. Dodds focussed attention on one of the burning problems upon which the future of the use of native labour in the mines is certain to turn.

He pointed out the great monetary loss to the mining industry for compensation, as well as the serious mortality from this disease, and the risk of infection amongst the native population. He then gave a short description of his methods of examination and the points which should lead to rejection of natives, laying much stress upon the value of the weight as an index, especially when considered in relation to physical standards of height, age, etc. In his experience, East Coast and Basuto natives are more susceptible to the disease than the Cape Colony natives.

A valuable discussion followed in which Dr. ORENSTEIN pointed to the difficulty of early repatriation introduced by the fact that the disease was of such rapid development. "If they repatriated people who were foci of infection, they would infect others in their kraals, so that one was simply spitting into the well from which they had to draw their water." This picturesque expression appears to fit the situation very well, and it is clear from the trend of the discussion that the difficulty of the problem is appreciated by the medical men in the Transvaal. The following resolution was carried :—

"That a Central Examination Board be created at which the final examination of all recruits is to take place, exclusive of voluntary boys."

This expression of opinion, indicating the general feeling that medical examination should be made as thorough as possible with a view to early diagnosis, is all to the good and points the way to a great improvement in the conditions of native labour in the mines.

S. L. C.

BAQUÉ (B). **Hygiène générale et tuberculose dans les oasis du Souf (Sahara constantinois).**—*Arch. Instituts Pasteur de l'Afrique du Nord.* 1921. Sept. Vol. 1. No. 3. pp. 250–261.

After a brief description of the climatic and meteorological conditions in the districts under consideration, the author proceeds to deal with the results of the von Pirquet tuberculin test applied to different sections of the inhabitants. The total "von Pirquet Index" for the communities of the Souf comes to 59·72 per cent., calculated upon a total of 878 persons, of whom 661 were children and 217 adults. Tabulated in age-groups, the percentages are as follows :—

1 to 5 years	21·51 per cent.
6 to 15 years	56·36 ,,
Over 15 years	75·57 ,,

It would seem that the proportion of "positive" reactions is considerably higher in the Souf than in regions of the Sahara. Thus, in the Figuig region, the von Pirquet Index is only 11 per cent. for children up to 15 years and 35 per cent. for adults ; at Tidikelt, 27 per cent. for children, 53·5 per cent. for adults ; while, in the Ouargla district the total index for the whole population examined is 36·5 per cent.

The author thinks that race has but little to do with the epidemiology of tuberculosis in the Sahara. Fifty years ago, the country was free from the disease. Now tuberculosis is common and progressive, introduced from the north and east by the Souafa emigrating into Tell and the Djerid. The susceptibility of the natives is attributed to drunkenness, venereal disease, and to the fact that the disease has

only recently been introduced, so that the inhabitants have not yet developed much resistance. With all this, the living together of infected and uninfected subjects is common and affords every facility for the spread of the disease.

S. L. C.

SCOTT (Henry Harold). **The Prevalence and Character of Tuberculosis in Hongkong.**—*Ann. Trop. Med. & Parasit.* 1921. Dec. 30. Vol. 15. No. 4. pp. 381–396.

This paper, which is Part III of that reviewed from the original MSS. in this *Bulletin* (see Vol. 18, pp. 376–379), deals with the "Morbid Anatomy as met with in Cases among Children" from the rich post-mortem material investigated by Dr. Scott at Hongkong.

Since this excellent paper, which deserves study by all those interested in tuberculosis, has already been reviewed in these pages, only a brief supplementary notice need now be given. The main interest of the work, apart from the fact that it forms a unique record of post-mortem findings in tuberculous children in a locality where bovine infection can be excluded, lies in the commentary which it makes to the work of A. GHON and to the observations of R. G. CANTI as to the frequency with which a primary lung focus is to be found in the cadavers of children with tuberculosis of the mediastinal and bronchial glands. The findings of Dr. Scott, though in the main confirmatory, are not entirely in line with those of the authors quoted. While he states that CANTI's observations have been "substantiated in the majority of the present series," he adds that "in 29 instances, ... caseous mediastinal glands were found without any focus being detected in the lungs." Of these, at least 17 would seem to have been unequivocal. A point of interest is the fact that of nine instances of focal tubercles in the brain, no less than eight were situated in the cerebellum. The author notes as a striking feature the rarity of bone, joint and skin affections. Of the 225 cases in the series, "there were five with tuberculous ulcers of the skin, four of these on the face and neck and one on the forearm. Not a single instance of tuberculous joint disease was encountered, and only three with bone lesions."

The cases reported seem to the reviewer to show a marked tendency to generalization of infection through the blood stream, perhaps even to a greater extent than might have been expected in the age-groups investigated. The work is of the highest quality and the paper constitutes a record of great value to the student of tuberculosis.

S. L. C.

DE MEDEIROS (Aumaury). **O problema da tuberculose.**—*Brazil Medico.* 1921. Oct. 15. Year 35. Vol. 2. No. 14. pp. 197–201.

This paper is an address to a Conference by one who evidently has a wide experience of tuberculosis and has devoted much time to Red Cross work in connexion with this disease. The paper has but little bearing on "tropical tuberculosis," but is of interest to those connected with educational campaigns destined to form part of the war against this social disease. Like FONTES, Dr. de Medeiros holds the view that acquired immunity plays a dominant part in the epidemiology of tuberculosis, a process of natural vaccination affording much of the

power that is manifest by adults in resisting Koch's bacillus; but he urges that considerations of this kind should in no way militate against the efforts of hygienists to limit the dissemination of the germ. He attributes to what he calls the "isolation" of the bacillus, as opposed to the "isolation" of infective persons, the rarity of infection amongst doctors and nurses in tuberculosis hospitals. We are inclined to attribute this often-quoted immunity of the staffs of such hospitals to acquired resistance rather than to the precautions taken in these institutions to prevent the dissemination of germs; but no doubt both factors play a part.

S. L. C.

FILHO (Moncorvo). **Defeza social contra a tuberculose infantil.**—*Brazil Medico.* 1921. Oct. 22. Year 35. Vol. 2. No. 15. pp. 212–217.

The author takes the view, already expressed by numerous workers of whom he quotes some of the more prominent, that the most effective time for the prevention of tuberculosis is during childhood. He shows how small is the part played by heredity in the transmission of the disease and lays stress upon the great danger of infection in the earlier years of life. In quoting the views of F. C. SMITH, of the United States Public Health Service, as to the measures to be recommended, amongst which are included the protection of infants and young children from infection, the care of the general health as a factor in general resistance, the special instruction of doctors and the education of the public with regard to this disease, he adds that our measures of prophylaxis must commence with the better care of the expectant mother and must be effective from the first days of infancy until the age of 20 years at least. All this is very true, and the paper should be read in the original by those about to organize measures for the prevention of tuberculosis; but only a short notice can be given here, as the bearing of the communication upon the problems of tuberculosis in the tropics is but slight.

S. L. C.

HECK (Maurice E.). **Results of the Recent Antituberculosis Campaign in Panama.**—*Proc. Med. Assoc. Isthm. Canal Zone.* 1918. Jan.–June. Vol. 11. Pt. 1. pp. 110–118.

This short paper shows clearly what can be done, even under the most difficult conditions and dealing with a population which includes many highly susceptible persons of tropical origin, by a carefully planned and thoroughly organized antituberculosis campaign. Panama has had a tuberculosis death-rate varying from 410·13 per 100,000 in 1910 to 521·41 per 100,000 in 1917; a record which speaks for itself. The author, on his appointment as Health Officer of Panama on August 29, 1917, at once started to investigate the existing statistics, improve notifications, apply the health regulations and improve housing conditions. It was ascertained that nearly all the deaths from tuberculosis were occurring in the families of labourers who occupied but one room; and that these rooms were dark, damp, dirty and ill-ventilated.

The city was taken section by section, "securing improvements in all houses in sections so covered before going on to a new section."

Property owners were circularized to make the necessary improvements in their property, but without result; but a reminder of a more threatening kind had the desired effect. The preliminary results are as follows :—

	Number.	*Mortality per 100,000.*	*Monthly Average.*
Deaths from Tuberculosis :			
First five months of 1917	131	524	26·20
First five months of 1918	94	376	18·80

This is a good record and speaks well for the future prospects of the work in Panama.

S. L. C.

SCOTT (Z. T.). **Some Phases of the Negro Tuberculosis Problem in Texas.**—*Texas State Jl. Med.* 1921. July. Vol. 17. No. 3. pp. 164–167.

The title of the paper raises hopes that it may afford information as to the incidence and mortality from tuberculosis amongst the negro population of Texas. The statistical part is, however, vague and unreliable, and it is clear that the author has had access to no records of a satisfactory kind. One phrase only is to be found as to clinical type :—" My experience has taught me that the negro with tuberculosis usually dies very quickly as compared with the white."

S. L. C.

CORNICK (Boyd). **The Question of Climate for Tuberculosis.**—*Texas State Jl. Med.* 1921. July. Vol. 17. No. 3. pp. 161–164.

This paper deals in general terms with the great curative effect of the climate—or certain samples of the climate—of Texas in tuberculosis. This beneficial effect he attributed to " sun-dried air." The recent observations of ROLLIER in Leysin and the work of Leonard HILL as to the value of the sun's rays in tuberculosis makes it probable that such a climate as that of Texas is likely to prove valuable for cases of this kind; but the present paper gives us no evidence of this apart from the expression of a strong personal opinion. Carefully controlled observations in such a climate would be of great interest.

S. L. C.

IYENGAR (K. R. K.). **Studies in the Value of the Wassermann Test, No. IV. Significance and Value of a Positive Wassermann Reaction in Tuberculosis.**—*Indian Jl. Med. Res.* 1921. Oct. Vol. 9. No. 2. pp. 369–370.

In this short paper, observations upon the sera of 70 patients suffering from pulmonary (40), glandular (14) and abdominal (16) cases of tuberculosis were carried out with a view to deciding whether infection with tuberculosis in itself was capable of introducing a factor of error in the reading of Wassermann tests for syphilis.

Of the 40 pulmonary cases, 8 were positive, of whom 3 gave a recent history of syphilis; of the 14 cases with tuberculosis of glands, 3 were positive; and 3 gave a positive reaction amongst the 16 abdominal cases.

In his previous Report (Study No. 1, *Indian Jl. Med. Res.*, Vol. 7, No. 2) the author had shown that in 400 healthy Indian male adults, 88, or 22 per cent., gave a positive Wassermann reaction, and he therefore concludes that the 20 per cent. now recorded in an unselected population infected with tuberculosis must be due to latent or clinically inactive syphilis.

He is therefore in a position to state that tuberculosis is not a cause of positive Wassermann reaction.

S. L. C.

REMLINGER (P.). **Essais de traitement de la tuberculose expérimentale du cobaye par les injections sous-cutanées de crachats tuberculeux stérilisés à 100 degrés.**—*Arch. Instituts Pasteur de l'Afrique du Nord.* 1921. Dec. Vol. 1. No. 4. pp. 422–427.

This paper deals with experiments to ascertain whether the sputum of tuberculous patients, heated to 100° C. for five minutes so as to kill the bacilli, would prove of any value as a vaccine either for the cure or the prevention of experimental tuberculosis in the guinea-pig. Suffice it to say that in six experiments in the *cure* of already infected animals, the periods of survival after infection for all the treated animals amounted to a total of 649 days, while the periods for the untreated group came to a total of 653 days; in other words, the vaccine had no effect, good or bad.

Its use as a "prophylatic" was even less encouraging, the "protected" animals dying sooner than the "unprotected." The work is published to spare other investigators from this negative field of research.

S. L. C.

BERIBERI.

W[ALSHE] (F. M. R.). **Some Recent Observations on the Nervous Lesion in Experimentally Produced Avian Polyneuritis (Experimental Beriberi).**—*Med. Sci. Abst. & Rev.* 1922. Jan. Vol. 5. No. 4. pp. 314–319.

In this study of the etiology of beriberi the author again insists upon the importance of co-ordinating the neuropathological findings with the clinical symptoms, and the dangers of judging the human disease from a too restricted study of birds, and of a too narrow biochemical view. He believes with FINDLAY that disorder of carbohydrate metabolism is an essential factor and that a poison is formed in the body, producing degeneration of nerve cells and nerve fibres, but he disagrees with FINDLAY when he regards the chromatolysis of the former as a sign of nuclear insufficiency and starvation, or states that the subsequent paralysis depends upon nuclear starvation. FINDLAY holds that there is an enlargement of the cortex of the suprarenals from an increased storage of phosphorized lipoids, which are essential for the synthesis of nucleic acid, and these stored lipoids can only be used by the nucleus in the presence of vitamin B; when the latter falls below normal the lipoids are immobilized in the adrenals instead of being passed on to the nervous system, which system then begins to run short of nuclear material and paralysis follows, or if the shortage is acute, death. This ingenious theory is not, according to the author, supported by pathological evidence, for we cannot say that chromatolysis indicates nuclear starvation, or that it can give rise to paralysis, and KELLAWAY has shown that the storage of phosphorized lipoids is not proven.

In acute beriberi, as in all other forms of toxic neuritis, the clinical symptoms may precede any pathological changes which are discoverable in the nerves post-mortem, but the proportion of damaged fibres found need not represent the total number of fibres out of action, and there is no necessity, as thought by VEDDER, FINDLAY, and MCCARRISON, to believe that the essential lesion must be in the nerve cells. Chromatolysis of cells appears much more rapidly than nerve degenerations, and therefore can be earlier demonstrated. The author wishes to reconcile the new theory of causation with the old clinical and pathological conception of the disease, viz., that of a toxic *positive* factor produced in the body through a dietetic deficiency.

[With regard to the early changes in the nerves which are not appreciable to the neuropathologist, the work of KATO, SHIZUMI, and MAKI (see below) on the delayed transmission of impulses along the affected nerves should be considered and received as very definite evidence.]

P. W. Bassett-Smith.

BOYD (J. E. M.). **Notes on Several Cases of Beriberi occurring amongst British Troops during and after a Voyage from India to France.** —*Jl. Roy. Army Med. Corps.* 1922. Apr. Vol. 38. No. 4. pp. 303–306.

The author describes how two battalions of British troops were sent from Karachi to Marseilles in a ship which was very badly overcrowded with 2,000 men, horses, mules, cattle, and 400 sheep. The ship left India on August 29, and the voyage took one month, but it

was broken by four days in Egypt, when the men trained from Suez to Alexandria; 23 cases were noted with symptoms of weakness of the legs, hyperaesthesia of the calf-muscles, some oedema of legs and rarely of the face, areas of anaesthesia, and loss of knee jerks; only one case showed cardiac signs. These cases were not considered to be true beriberi, and were returned as neuritis. On disembarking at Marseilles, 12 of the Manchesters and 25 of the Connaught Rangers were sent to hospital and were recognized as suffering from beriberi. Both battalions had been in the Punjab before embarking, and neither they nor the ship's company had shown previous cases of beriberi. The food is said to have been good, but the overcrowding and unsanitary condition of the ship were definite epidemiological facts.

P. W. B-S.

JOUVEAU-DUBREUIL (H.). **Le béribéri au Setchouan (Chine).**—*Bull. Soc. Path. Exot.* 1921. Dec. 14. Vol. 14. No. 10. pp. 666–685.

Beriberi has been known among the Chinese since the seventh century and is called "Kio K'i," meaning vapour or humidity of the feet. Since the opening of the hospital in Tchentou, cases have always been present; it has also occurred in an epidemic form among the population, chiefly where people are gathered together in camps, forts, schools, prisons, etc., most commonly in low lying areas. Generally speaking, the food, housing, and hygienic conditions were good in those places where the disease was endemic, and the author could find no support for food deficiency. He states that the rice used is home grown, roughly milled, and only partly decorticated; 97 cases were treated in the hospital during 1918–19. Of these 92 were soldiers, 3 were students, and 2 were civilians; 91 are described as being slight (*rudimentaires*), 1 atrophic, and 3 wet. The figures are not large and the cases were mostly drawn from one particular group, so that the deductions are not of much value.

P. W. B-S.

TUPAS (A. V.). [**Cases of Infantile Beriberi admitted to Philippine General Hospital during Year 1920.**]—*Jl. of the Philippine Islands Med. Assoc.* Manila. 1921. May–June. Vol. 1. No. 3. p. 108. [Summarized in *Jl. Amer. Med. Assoc.* 1921. Nov. 12. Vol. 77. No. 20. p. 1603.]

Of 36 cases of infantile beriberi admitted to hospital, 30 were under three months of age and 11 died. X-rays were used in 16, 14 of whom had an enlargement of the heart to the right, and two to the left. Post-mortem in five of the fatal cases there were constant lesions, hydropericardium, punctate haemorrhages of the lungs, passive congestion of liver, spleen and kidneys, degenerative neuritis of the vagus and dilatation of the heart, the right ventricle being three times the size of the left.

P. W. B-S.

SPRAWSON (C. A.). **The Heart in Beriberi and the Evidence of the Differential Stethoscope.**—*Indian Jl. Med. Res.* 1922. Jan. Vol. 9. No. 3. pp. 625–629.

In Mesopotamia thousands of Chinese were employed and hundreds suffered from beriberi, mostly in a latent form; of these 62 were

carefully investigated. Knee reflexes were present in 27, increased in 18, and absent in 17. Anaesthesia was present in 42, marked in 8, absent in 8. In 42 there was no deep tenderness of the calf muscles, but it was definite in 14. In 14 there was no oedema, in 18 it was present and in 8 it was very marked. The average pulse rate lying down was 84, the limits being 52–126. In 32 there were abnormal cardiac signs, mostly dilatation of the right side. The use of Leyton's stethoscope in 55 cases showed that beriberi cases exhibited evidence of myocardial degeneration, the ratio of the intensity of the apex and aortic sounds being 1·6 in beriberi to 2·0 in healthy Chinese. A short description of the stethoscope and its use is given.

P. W. B-S.

SHINKAI (Kinjiro). [**On the Quantitative Estimation of Urea and Amino-nitrogen in the Blood and Urine of the Patient of Beriberi.**] —*Nihon Naika Gakkwai Zasshi* (*Jl. Jap. Soc. Intern. Med.*). 1921. Feb. Vol. 8. No. 11. [Summarized in *Japan Med. World.* Tokyo. 1921. June 20. Vol. 1. No. 2. p. 21.]

In about 50 per cent. of acute cases of beriberi an increase of amino-nitrogen was found in the blood or urine, but never in both fluids at the same time. At present no pathological importance can be attached to this.

P. W. B-S.

WELLS (A. H.). **The Preparation of Tikitiki Extract for the Treatment of Beriberi.**—*Philippine Jl. Sci.* 1921. July. Vol. 19. No. 1. pp. 67–73.

In the Philippines the removed pericarpal layer of the rice grain is called tikitiki, and is sold as cattle food for about two dollars per sack. VEDDER and WILLIAMS, and later, CHAMBERLAIN, showed how an extract curative for beriberi could be prepared from this. In 1913 the Bureau of Science commenced the manufacture and distribution of the extract on a large scale, and in 1916 the results had proved to be so good that it was determined to revise the method and increase the production; in that year 6,687 bottles of it were made In 1918 the number had risen to 8,188, but had not caught up the demand. The present method of preparation is as follows:—Polishings from freshly milled rice, preferably of a new crop, clean and finely ground, are extracted for 48 hours in a solution of 25 per cent. alcohol by weight. The proportion of tikitiki to alcohol is 1–2. The mixture is agitated and decanted, and the residuum passed to a press. The combined extracts then go to a distillation plant and are evaporated under a pressure of 1 cm. with a maximum temperature of 75° C., the alcohol distilled over being passed back to the extraction plant. The syrup-like fluid is clarified and freed from inactive substances by treatment with ethyl alcohol, centrifuged, and concentrated to a density of 1·32, again centrifuged, and separated. The finished product is then heated to 65° C., bottled, pasteurized for three successive days at 62° C. labelled, lacquered and distributed. The extract does not come in contact with metal except in two of the stills, which are tin lined; one still is glass enamelled. The precipitation, cooling, and storage

are done in glass or porcelain vessels. One mil. of this extract represents the active constituents of 20 gm. of rice polishings. There are two grades of tikitiki, one from white rice and one from dark or red rice; the latter does not at present give satisfactory results. The Public Welfare Board require 10,000 bottles of this extract monthly. Extracts prepared by local druggists are generally defective; their supply indicates the prevalence of the disease in the locality. It is pointed out that although 10,870 bottles were issued in 1920, a larger government production is required to reduce still further the infant mortality.

P. W. B-S.

HOFMEISTER (Franz). **Studien ueber qualitative Unterernährung. I. Mitteilung. Die Rattenberiberi.** [Studies on Qualitative Under-nourishment. Part I. Rat. Beriberi.]—*Klin. Woch.* 1922. Mar. 11. Vol. 1. No. 11. pp. 522–523.

The experiments show that on a vitamin B free diet, rats first develop ataxic symptoms and clonic spasms, and finally become paralysed, symptoms which indicate early disturbances of the central nervous system. This view is confirmed by the anatomical findings of Dr. KILN, who constantly found in all typical beriberi animals multiple haemorrhages at the base of the brain and in the cerebellum, with degeneration of the nerve elements in the same parts, these lesions corresponding with the nerve disturbances found during life. On the other hand the degeneration of the peripheral nerves was slight or absent, even in pronounced cases. These pathological findings point to a haemorrhagic encephalitis similar to that found in chronic poisoning by arsenic, lead, and alcohol, rather than to a polyneuritis. He thinks that the site of the lesions shows where the under-nourishment of the nervous system has been most marked. These lesions apparently vary in different animals; in man and fowls the peripheral nerves suffer first and most heavily, while in rats and pigeons it is the central nervous system.

The relationship to chronic poisoning is close, and it shows that under-nourishment (namely vitamin B starvation) and chronic poisoning, although different in cause, lead to similar disturbances in the co-ordination of the cellular processes, and finally to the same anatomical pathological changes.

[This means that in his opinion beriberi is caused by some toxic poison].

P. W. B-S.

UJIHARA (Kinichi) & ROKKAKU (Takawo). [**A Study of Beriberi, in Special Reference to Fermentation.**]—*Nippon Shokakibyo Gakkwai Zasshi* (*Japan Jl. Gastro-Enterology.*) 1921. July. Vol. 20. No. 4. [Summarized in *Japan Med. World.* Tokyo. 1922. Jan. 15. Vol. 2. No. 1. p. 18.]

The author, from his studies on experimental rice disease of birds, arrived at the following deductions :—(1) There were marked disorders of pancreatic function. (2) Decrease of the body content of diastase.

(3) Increase of auto- and heterolysis of the liver and also lysis of the body albumen, owing to the quantitative decrease of the trypsin content of the blood ; and also by the supply of the deficient diastase, the disease could not be checked.

P. W. B-S.

KAWAKAMI (Zen). [**Physiological and Pathological Study on the Nerves of the Bird suffering from Polished Rice Disease. Pathological Study.**]—*Keio Igaku* (*Keio Med. Jl.*). 1921. Mar. Vol. 1. No. 3. [Summarized in *Japan Med. World.* Tokyo. 1921. Aug. 15. Vol. 1. No. 4. p. 12.]

The nerves of birds which had died from starvation showed no differences from those of normal birds, but distinct changes were seen in birds that had been fed upon polished rice. The microscopical changes in the latter always had the same characters, but even if these were similar in degree the functional changes observed might differ.

P. W. B-S.

KATO (Gen-i-chi), SHIZUME (S.) & MAKI (R.). **On the Nature of Paralysis due to Polished Rice Disease in Domestic Fowls.** (An Abstract from the Paper read before the Meeting of the Kakke-Beriberi-Investigation Committee, on March 9, 1920.)—*Kitasato Arch. Experim. Med.* 1921. Vol. 4. No. 3. pp. 207–216.

In continuation of their experiments on birds, it was shown by the authors that the velocity of the impulse along the nerves of fowls suffering from paralysis due to the use of polished rice was much less than normal, and could be restored to the normal rate after cure of the paralysis by the use of bran extract. They found also that though the majority of the nerve fibres were again rendered normal, the conductivity of a few might indicate no sign of recovery and remain destroyed. They argued that if the hydrogen ions are the cause of the paralysis in bird beriberi, paralysis caused experimentally by hydrogen ions must be curable by rice bran extract ; this they proved to be the case, using frogs and toads as experimental animals. The extract restores the function of the nerves by displacing the absorbed hydrogen ions ; it is, however, rather harmful to normal nerves. The extract is said to lessen in a remarkable way the surface tension of a solution so that it will be strongly adsorbed, and so displace the hydrogen ions. "Oryzanin," the commercial product, acted like the laboratory extract. The extract had no curative effect on the paralysis caused by cocaine, chloral hydrate, or urethane. By experiments on the sciatic nerves removed from paralysed fowls, the concentration of the hydrogen ions was found to be 5 to 10 times more than that of normal nerves ; an increase was also found in the spinal cord. The results with pigeons were similar to those obtained with fowls. From further experiments they conclude that the diseased nerves of fowls have an increased power of absorbing hydrogen ions and a decreased power to adsorb hydroxyl ions, compared with healthy nerves. Microscopically the condition of the nerves paralysed experimentally with hydrogen ions was similar to that found in the nerves of fowls with rice-caused beriberi. [For summary of a similar paper of these authors, see this *Bulletin*, Vol. 19, p. 75.]

P. W. B-S.

TAKAHIRA (Hidewo). [**On the Hydrogen-ion Concentration of the Extracts of the Heart and the Blood Vessels of the Bird suffering from Polished Rice Disease.**]—*Keio Igaku* (*Keio Med. Jl.*). 1921. Oct. Vol. 1. No. 10. [Summarized in *Japan Med. World*, Tokyo. 1922. Feb. 15. Vol. 2. No. 2. p. 50.]

Analysis of the Hydrogen-ion concentration of the heart and blood vessels of birds suffering from polished rice disease showed it to be higher than that of the controls, its level varying with the degree of the pathological lesion.

P. W. B-S.

NI (Tsang G.). **Beriberi : Some Facts and the Possible Hypothesis.**—*Jl. Lab. & Clin. Med.* 1922. Mar. Vol. 7. No. 6. pp. 340–348.

This is a controversial and theoretical discussion, and contains no new facts. A disturbance of vitamin metabolism is looked upon as one, if not the only, factor in causing beriberi, the infectious and nitrogen starvation theories being discarded.

P. W. B-S.

WRIGHT (Samson). **The Effect of B-Vitamin on the Appetite.**—*Lancet.* 1921. Dec. 10. pp. 1208–1209. With 1 chart.

COWGILL (George R.). **A Contribution to the Study of the Relationship between Vitamin-B and the Food Intake in the Dog.**—*Proc. Soc. Experim. Biol. & Med.* 1921. May. Vol. 18. No. 8. pp. 290–291.

DAMIANOVICH (H.). **Quelques recherches sur la Vitamine B.**—*C.R. Soc. Biol.* 1921. July 23. Vol. 85. No. 27. pp. 591–592.

Wright summarizes his paper as follows :—

"Vitamine B acts by facilitating the efficient carrying out of the functions of the intestinal canal. The main effects produced by the absence of the vitamin—*i.e.*, diminished food consumption, loss of weight, and ultimate death—are due to intestinal stasis and the absorption of toxic bodies which results therefrom."

Cowgill also brings forward evidence to show that vitamin B increases the appetite in dogs. Damianovich considers that this vitamin accelerates diastatic processes and especially the synthesis of nucleins.

A. D. Bigland.

i. DE WYSS (W. H.), ii. WRIGHT (Samson), iii. HESS (W. R.). **B-Vitamin and Pigeon Beriberi.** [Correspondence.]—*Lancet.* 1922. Jan. 14. pp. 100–101 ; Feb. 11. p. 297 ; Mar. 18. p. 554.

i. It is stated that the view held by Samson WRIGHT, that beriberi symptoms are caused by the absorption from the intestinal canal of toxic bodies produced by stasis, due to the absence of vitamin B, has been contradicted by ABDERHALDEN and EWALD as well as by MESSERLI. Experiments carried out by W. R. HESS on pigeons at Zurich, and here shortly reported by DE WYSS, proved that there was an inhibition of oxidation processes in the tissues of birds suffering from vitamin B deficiency, and that, vice versa, symptoms of avian beriberi could be produced by injecting substances known to inhibit such processes ; therefore the B deficiency consists in an inhibition of the oxidative power, and the B vitamin furnishes the structural basis of the oxidative

ferments of the body. It is not claimed that B vitamin deficiency injures the whole chain of oxidative processes, probably only one of them, but this may lead on to the destruction of others. The view that the whole syndrome is due to the absence of a catalytic agent explains how the administration of traces of B vitamin are sufficient to counteract the symptoms. No details are given with regard to the experiments and the controls used ; these will appear in the full paper by HESS.

ii. The view held by DE WYSS is not accepted by the writer, and is not in conformity with his own experiments. He points out that the diminution in the oxidative powers of the tissues is rather due to an intoxication which is secondary to intestinal stasis produced by the absence of the vitamin from the diet.

iii. A reply to Dr. Samson WRIGHT, who, the author states, does not accept the evidence of his experiments. All the symptoms of B vitamin deficiency, he considers, are due to a loss of the oxidative power of the tissues, the insufficiency of the alimentary tract being only a part of the general insufficiency. There are two phases of the oxidative process in the cell—(*a*) reduction of carbohydrate to lactic acid ; (*b*) oxidative removal of the lactic acid formed. The experiments of MESSERLI seem conclusive against the intoxication theory of Samson WRIGHT.

P. W. B-S.

SIMMONNET (H.). **Alimentation artificielle chez le pigeon. Régime complet d'équilibre nutritif carencé en facteur B.**—*Bull. Soc. de Chimie. Biol.* 1921. Dec. Vol. 3. No. 10. pp. 583–612. With 11 charts.

In this paper the author describes a method of studying avian polyneuritis which, he claims, has several advantages over the methods generally employed.

In the first place the pigeons are kept upon a diet which maintains them in equilibrium but in such form that they are on the threshold of starvation. In this way the suppression of the active factor in a very short time leads to polyneuritis. The diet is as follows :—

Residu de viande	11 gm.
Melange salin	4 gm.
Agar pulvérisé	5 gm.
Huile d'arachides	5 gm.
Cellulose	5 gm.
Fécule de pommes de terre ..	60 gm.
Beurre..	10 gm.

Apparently this diet is sufficient to keep birds alive for long periods (in certain cases for over a year). Factor *B* was obtained from "Levure de bière sèche Byla" : (1) by extraction with alcohol at 70° C. ; (2) by extraction in the cold. The latter was somewhat the more potent.

Birds kept upon the above diet with the extract added for 90-100 days show premonitory polyneuritic symptoms within two to five days of stopping the extract. On the other hand, birds fed on ordinary diet and then deprived of factor *B* do not exhibit nervous symptoms until 30-40 days have elapsed. The advantages claimed for this method are : (1) that the number of starvations to which the animal

is subjected is reduced to a minimum. Also it is pointed out that if polyneuritis be due only to inanition then it is important to reduce the number of substances upon which this inanition depends ; (2) that the animals are on the threshold of starvation always, while maintaining outwardly physiological equilibrium.

With animals thus fed the author has studied the curative and preventive properties of various extracts of brewer's yeast. The histories of the animals are given in considerable detail.

A. D. B.

MATHEU (C. Pillado). **Recherches cliniques sur la vitamine B.**—*C.R. Soc. Biol.* 1921. July 23. Vol. 85. No. 27. p. 593.

ACUNA (M.) & GARRAHAM (J. P.). **Resultats cliniques de l'emploi de la vitamine B.**—*C.R. Soc. Biol.* 1921. Dec. 17. Vol. 85. No. 37. pp. 1218–1219.

Sick infants were given extracts rich in vitamin B, but no definite benefit was reported by Acuna and Garraham. On the other hand Matheu has been able to show good results on these lines, the children gaining in weight and showing an increase in red blood corpuscles.

A. D. B.

COWGILL (George R.). **Studies in the Physiology of Vitamins. II. Does Vitamin-B Stimulate Glands in a Manner similar to the Alkaloid Pilocarpine?**—*Proc. Soc. Experim. Biol. & Med.* 1921. May. Vol. 18. No. 8. p. 290.

FUNK (Casimir) & DUBIN (Harry E.). **The Vitamines of Yeast and their Rôle in Animal Nutrition.**—*Proc. Soc. Experim. Biol. & Med.* 1921. Oct. Vol. 19. No. 1. pp. 15–16.

PAEZ (Félix R.). **Relación sobre el beriberi. Presentada al Tercer Congreso Venezolano de Medicina.**—*Gac. Méd. de Carácas.* 1921. July 31. Vol. 28. No. 14. pp. 211–217.

SANTOS (Francisco O.). **Some Plant Sources of Vitamins B and C.**—*Proc. Soc. Experim. Biol. & Med.* 1921. Oct. Vol. 19. No. 1. pp. 2–3.

STAMMERS (Arthur Dighton). **LVII. Feeding Experiments in Connection with Vitamins A and B : (I) The Value of Steam-Distilled Palm Kernel Oil as a Control Fat. (II) Wheat Bran as a Source of Vitamins A and B.**—*Biochemical Jl.* 1921. Vol. 15. No. 4. pp. 489–493. With 2 figs.

SCURVY.

DONALDSON. [**Scurvy: Demonstration.**]—*Proc. Transvaal Mine Med. Officers' Assoc.* 1921. Dec. Vol. 1. No. 9. pp. 1–10. With 4 text figs.

A practical demonstration was given of the intravenous administration of orange juice for the treatment of scurvy. From 15–35 cc. of strained juice neutralized with NaH and generally made up to 60 cc. with sterile saline had been injected every third day. The larger dose might cause vomiting and pain; 15–20 cc. was generally sufficient. This method of treatment was found to be far more efficacious and rapid than when the juice was given by the mouth, but the number of cases so treated was not large, about one dozen. It would appear that the oranges must be fresh and the juice recently expressed. There was no sterilization by boiling.

P. W. Bassett-Smith.

SQUAIR (J.). **Champlain's Reference to Scurvy.**—*Canadian Practitioner & Review.* 1921. Sept. Vol. 55. No. 9. pp. 271–273.

The records date back to 1604, when the disease was called "Le mal de la terre." It caused a great morbidity and mortality, in one instance 35 deaths in 79 cases. Its characters, which are well described, include subcutaneous, mucous, and intramuscular haemorrhages. The disease was attributed to the salt meat ration. Natives who changed their diet of fresh meat to the salt meat also died. The most interesting point in the paper is the description given of the origin and use of a decoction of spruce leaves and tops as a curative agent. The plant was called "aneda," which was the name of an Indian chief by whom it was probably introduced.

P. W. B-S.

VEDDER (Edward B.). **The Etiology of Scurvy.**—*Milit. Surgeon.* 1921. Nov. Vol. 49. No. 5. pp. 502–512. With 8 charts.

The object of the experiments here recorded was to determine if the removal of the acids from orange juice, etc., was detrimental or otherwise to its antiscorbutic power. The method of preparing the different juices and the effects on guinea-pigs are fully described, and are summarized as follows:—

1. The antiscorbutic vitaliment is neither an acid nor the salt of an acid, since an extract from which all the acids and salts have been removed both prevents and cures cases.

2. The antiscorbutic vitaliment may be stored without impairment for at least several months in neutral aqueous solution.

3. When orange or lemon juice is neutralized and diluted with alcohol it retains the antiscorbutic vitaliment if used immediately, but this is destroyed if the solution is stored.

4. When orange juice is extracted with alcohol, acetone neutralized, and the soluble part stored in alcohol, the solution cures and prevents scurvy but does not produce normal growth. The vitaliment is altered but not entirely destroyed.

5. A similar result is obtained when orange juice is extracted with alcohol, acetone neutralized, and the dry residue extracted with ethyl acetate.

It would appear that a chemical change takes place, or that both a scurvy and a growth vitaliment are present, and the amount of activity depends on the solvent used.

The antiscorbutic vitaliment is apparently an active reducing agent, it decolorizes Pot. permang., and aqueous solution of fuchsin, and is rendered inactive by hydrogen peroxide, sulphuric acid, and alkaline hydroxides. It therefore has a strong affinity for oxygen and loses its physiological action when it becomes oxidized.

P. W. B-S.

DELF (E. Marion). **Studies in Experimental Scurvy, with Special Reference to the Antiscorbutic Properties of some South African Foodstuffs.**—*Lancet.* 1922. Mar. 25. pp. 576–579.

The author describes cases seen in the Rand mines which indicate that starvation is a contributory cause of scurvy; she also notes that owing to recent legislation the cases have been greatly reduced in number but that latent scurvy is still occasionally epidemic. Experiments as to the antiscorbutic value of different foods gave the following results :—

Food.	*Relative value.*	*Food.*	*Relative value.*
Fresh peach ..	50–80	Vegetable marrow	33
Pineapple ..	44	Pumpkin ..	5
Orange	100	Sweet potato ..	31
Naartje (Tangerine Orange).. ..	80	Sugar Cane ..	0
Pawpaw	40		

It was found that 2–5 gm. of germinating peas were sufficient to protect a guinea-pig for at least 90 days, whereas soya beans had no such power because in germinating they store oil and not starch. The germinating peas should simmer in a double steamer, plus the addition of a little alkali, and the liquor should be used as well as the peas. Kaffir beer was found to have little, if any antiscorbutic value. For curative experiments orange juice was the most valuable antiscorbutic; tomato juice had little appreciable value and pawpaw acted best in severe scurvy associated with dysentery.

P. W. B-S.

ECKMAN (Philip F.). **The Antiscorbutic Value of Dehydrated Fruits.** —*Jl. Amer. Med. Assoc.* 1922. Mar. 4. Vol. 78. No. 9. pp. 635–636. With 2 text figs.

When a quantity of 2–4 gm. respectively of dried apricots, peaches, apples, plums, prunes, cherries, or logan berries was added daily to a basal antiscorbutic-free diet it was found that 4 gm. of peaches was the only fruit able to delay the onset of scurvy in guinea-pigs for 3–4 months; the apricots and apples had very slight value, if any.

P. W. B-S.

GIVENS (Maurice H.), MCCLUGAGE (H. B.) & VAN HORNE (E. G.). **The Antiscorbutic Property of Fruits. II. An Experimental Study of Apples and Bananas.**—*Amer. Jl. of Diseases of Children.* 1922. Mar. Vol. 23. No. 3. pp. 210–225. With 13 charts in text.

A large number of experiments were carried out on guinea-pigs to determine the value of fresh and dried apples and bananas as antiscorbutic foods. These demonstrated that raw apples and raw bananas are antiscorbutic; if either were subjected to heating, as in ordinary canning or desiccation, the antiscorbutic vitamin was materially diminished, and the fruits must be then considered as unreliable sources of the vitamin. All the dried products were used within two and a half months after dehydration. The question of the maturity of the fruit has also to be taken into consideration, whether fully ripe or not. It was found that dried apple peelings were a better antiscorbutic agent than the dried apples, which would seem to indicate that the vitamin is associated with the cells, as there are more cells in the peeling than in the body of the apple; however, it is possible that the cellulose covering the apple peeling may have acted as a protective agent against the destructive influence of the heat in dehydrating.

P. W. B-S.

SMITH (Clarence A.), BERGEIM (Olaf) & HAWK (Phillip B.). **The Antiscorbutic Potency of Strawberries.**—*Proc. Soc. Experim. Biol. & Med.* 1921. Vol. 19. No. 1. p. 22.

Guinea-pigs suffering from experimental scurvy were cured in seven days by the addition to their ration of 10 cc. of the juice of strawberries, either fresh, or boiled for five minutes. No details are given.

P. W. B-S.

i. BEZSSONOFF (N.). **Du principe antiscorbutique dans le jus de pomme de terre extrait en présence d'acides.**—*C.R. Acad. Sci.* 1921. Aug. 22. Vol. 173. No. 8. pp. 417–419.

ii. ——. **Sur une réaction colorée commune aux extraits antiscorbutiques et à l'hydroquinone.**—*Ibid.* Sept. 5. Vol. 173. No. 10. pp. 466–468.

i. In previous experiments the author found that raw potato had a strong antiscorbutic action but that the juice expressed by pressure had little; if, however, the juice was collected from pounded potato it possessed to a large extent the antiscorbutic properties. This made him believe that the instability of the antiscorbutic principle was due in great part to the action of an enzyme, particularly that of an oxydase. BERTRAND showed in 1907 that different acids, including citric and tartaric acids, used in very dilute strengths, were able to paralyse completely the action of the oxydase. The author found that the potato juice extracted in the presence of small quantities of either citric or tartaric acids gave slightly better protection to guinea-pigs than the juice extracted without acid; the animals lived longer but generally developed scurvy signs at last.

ii. The author describes a colour test for vitamin C, which is a modification of the FOLIN-DENIS phenol reaction (1912 15). The colour is slate-grey to blue in the case of antiscorbutic fluids, and is

not shown with extracts of grains and other substances known to be inactive. It is stated that the test will detect the destruction of vitamin C in a fluid normally rich, such as in boiled orange juice. The blue colour is shown in potato juice extracted in the presence of acid but not in that extracted without, the latter being only feebly anti-scorbutic.

The author says " It is possible to suppose that the reaction is not due to the antiscorbutic substance, or at least not to this alone, but to an unstable radicle, probably a polyphenol, which in the solution detaches itself easily from the vitamin C." The monophenols, salicylic acid and tyrosine, do not give the reaction, but a diphenol, hydroquinone, gives the same blue reaction as that given by fluids containing vitamin C.

P. W. B-S.

DUTCHER (R. Adams), HARSHAW (H. M.) & HALL (J. S.). **Vitamine Studies. VIII. The Effect of Heat and Oxidation upon the Anti-scorbutic Vitamine.**—*Jl. Biol. Chem.* 1921. Aug. Vol. 47. No. 3. pp. 483–488. With 3 charts in text.

Guinea-pigs were used for the experiments and were divided into six groups, four in each. They received the usual basal diet and 3 cc. of raw orange juice daily. The following is a summary of the results obtained :—

" 1. The antiscorbutic vitamin is not destroyed by heating at Pasteurization temperature (to 63° C.) for 30 minutes, in closed vessels, or by boiling (at 100° C.) for 30 minutes, under reflux condensers.

" 2. Hydrogen peroxide possesses some destructive action when added to orange juice at room temperature, and the destructive action is increased when the orange juice hydrogen peroxide mixture is heated at 63° and 100° C.

" 3. The antiscorbutic properties of orange juice are susceptible to oxidation, but, in the absence of oxidizing agents, are stable to heat up to the boiling temperature of orange juice."

[In ZILVA's experiments with boiled lemon juice in an atmosphere of CO_2 the antiscorbutic property was not destroyed (see this *Bulletin*, Vol. 18, p. 60).]

P. W. B-S.

EDDY (Walter H.), SHELOW (E.) & PEASE (R. A.). **The Effect of Cooking upon the Antiscorbutic Vitamin in Cabbage.**—*Proc. Soc. Experim. Biol. & Med.* 1922. Jan. 18. Vol. 19. No. 4. pp. 155–160. With 2 figs.

A series of experiments on guinea-pigs showed that ten times the protective amount of fresh cabbage was inadequate to protect from scurvy when the cabbage had been boiled in ordinary cooking, and that the vitamin seemed to be less resistant than that of orange or tomato juice. The authors agree with ELLIS, STEENBOCK & HART that desiccation of cabbage in CO_2 at 65° C. was very destructive of the antiscorbutic factor. It was also observed that, with the maximum ration, there was no difference in the amount of destruction of the C vitamin when the cabbage was cooked in an open kettle or in the pressure cooker. A rather poor plate is given showing the changes found in the costo-chondral junctions of the ribs of treated rats.

P. W. B-S.

HESS (Alfred F.) & UNGER (Lester J.). **The Destruction of the Antiscorbutic Vitamin in Milk by the Catalytic Action of Minute Amounts of Copper.**—*Proc. Soc. Experim. Biol. & Med.* 1921. Dec. 14. Vol. 19. No. 3. pp. 119–120.

As oxidation has been proved to destroy the antiscorbutic vitamin, it was thought that certain catalysts, such as copper, might act in increasing the oxidative process. Three groups of guinea-pigs were used, with a basic diet and diluted dry milk.

1. The milk was heated in a glass vessel at 60° C. for 40 minutes: none of the animals developed scurvy in four months.

2. The milk was heated to the same degree in a copper vessel: all developed the disease and died after about four weeks.

3. The same as No. 2, but each animal received daily 2 cc. of orange juice: all remained healthy. The antiscorbutic factor, therefore, must have been removed in No. 2. As milk frequently shows evidence of copper after commercial pasteurization or condensation, this may explain in some degree the varying results obtained with heated milk; the copper content in the milk may also exert a deleterious action, especially in infants, an important practical point to be remembered.

P. W. B-S.

HERZOG (F.). **Ueber experimentellen Skorbut bei Meerschweinchen.**—*Frankfurter Ztschr. f. Path.* 1921. Vol. 26. No. 1. pp. 50–79. With 2 text figs.

The author points out that HOLST and FRÖLICH were the first to make observations on scurvy in guinea-pigs, and noted the resemblance to BARLOW's disease and infant scurvy; dogs and pigs also had the same disease. The author experimented with five guinea-pigs, and gives in minute detail the blood changes before death, and the pathological conditions after. He appears to consider that the disorganization of the blood-producing organs and the changes in the bone marrow cannot be taken as the reason for the haemorrhagic diathesis and the anaemia of scurvy, which are probably due to changes in the walls of the blood-vessels themselves. The Röntgen ray examinations showed the same typical changes which have been described by FRANKELL; the distinct dark band was clearly visible near the bone cartilage junction. The histological changes in the costo-chondral junctions are well shown in the two figures.

P. W. B-S.

MOURIQUAND (G.) & MICHEL (P.). **Le scorbut jugé par l'expérimentation.**—*Paris Méd.* 1921. May 7. Vol. 11. No. 19. pp. 366–373.

The authors review the experimental work to determine the etiological factors of scurvy. They naturally give an unconscious preponderance to the theories that they have advanced and the experiments which support them, but these are of great importance and are the result of long and close enquiry. They have, however, no new facts to record. For the deficiency factors the term "minimal substances" is used; these may act as ferments, catalysers, or complement, and comprise not only vitamins, but amino-acids, certain salts, even certain hydrocarbons and carbohydrates, and also the important "eau vivante" of vegetable tissues.

P. W. B-S.

MOURIQUAND (Georges) & MICHEL (Paul). **Scorbut et acidose.**—*C.R. Soc. Biol.* 1921. Nov. 12. Vol. 85. No. 32. pp. 867–868.

It has been stated by MORGEN & BERGER that the addition of bicarbonate of soda to a scurvy diet prevents in rabbits the onset of the disease. FUNK confirmed this so far as rabbits were concerned, but with guinea-pigs there was no such effect. GLANZMANN, experimenting with guinea-pigs, added to the basal diets bicarbonate of soda, citrate of soda, lactate of calcium, and dry beer yeast, singly or together, and found with the first two a slight delay in the onset of the symptoms (100–150 days), but presence of acetone in the urine after death. The authors repeated their experiments, and demonstrated that scurvy in the guinea-pig is apparently not due to a condition of acidosis, and is not prevented by the administration of alkalies.

P. W. B-S.

BEDSON (S. Phillips). **The Blood Picture in Scurvy, with Particular Reference to the Platelet.**—*Brit. Med. Jl.* 1921. Nov. 12. pp. 792–793.

A diminution in the number of blood platelets is by many considered to indicate a tendency to haemorrhages, as shown by DUKE in 1910. In scurvy, WASSERMANN and KIRCH found that there was a reduction in the number; HESS and other American observers did not confirm this. The author has carefully investigated the blood changes in four cases of experimental scurvy in guinea-pigs and two in monkeys, none with any definite decrease in the blood plates, and in two human cases with haemorrhagic symptoms. The results were interesting: one case of true scurvy showed no marked change; in the other with purpura haemorrhagica the fall in the blood platelets was very remarkable. The technique used, which is given in detail, is no doubt a very important factor in obtaining reliable results. It is interesting to note that in the pre-scurvy stage the number of red cells is increased per cmm.; while in the acute stage, when haemorrhages are most marked, the numbers fall slightly below normal.

P. W. B-S.

PELLAGRA.

GOLDBERGER (Joseph) & TANNER (W. F.). **Amino-Acid Deficiency probably the Primary Etiological Factor in Pellagra.**—*Public Health Rep.* 1922. Mar. 3. Vol. 37. No. 9. pp. 462–486.

The authors summarize their work as follows :—

" The more important part of the evidence proving diet to be the primary controlling factor in the prevention and causation of pellagra is briefly summarized.

" Cases of pellagra are reported that were observed to occur in individuals who were known to have consumed daily, during periods of not less than two and one half months immediately before the onset of the distinctive eruption, what is judged to have been a liberal supply of mineral elements and the known vitamines, which would indicate that a deficiency of these dietary factors is not essential in the causation of the disease.

" These factors having thus been excluded, the dominating rôle of diet in the prevention and causation of pellagra must be referred primarily to the character of the protein (amino-acid) supply, this being the only other dietary factor at present known to be necessary to physiological well-being.

" On the assumption that all the dietary factors essential in human nutrition are known, it may be concluded that the essential etiological dietary factor is a specific defect in the amino-acid supply, probably in the nature of a deficiency of some special combination or combinations of amino-acids.

" There is reason to believe that besides the specific amino-acid defect, pellagra-producing diets may and probably frequently have other more or less serious faults including non-specific amino-acid deficiencies which may operate as accessory etiological factors.

" In some preliminary therapeutic trials with amino-acids the dermal lesions in each of two cases seemed to show a markedly favourable reaction to cystine ; and in a third case a steady gain in weight, with some improvement in diarrhoea, accompanied the administration of both cystine and tryptophane."

A. D. Bigland.

NICOLAS (J.), MASSIA (G.) & DUPASQUIER (D.). **Considérations étiologiques sur la pellagre avec 5 observations inédites.**—*Ann. de Dermat. et de Syph.* 1922. Jan. 6th Ser. Vol. 3. No. 1. pp. 1–23.

Five cases of pellagra are described in some detail. All were females, all recovered, and there is nothing particularly worthy of clinical note. The various possible etiological factors are discussed, though no very exact numerical evidence is given regarding the diet of the patients. It is suggested that living upon the same diet week after week may be one of the factors, and it is pointed out that such unvarying diet is especially common among women of the poorer classes. For example, one of the cases described seemingly lived on eggs alone.

A. D. B.

JELKS (John L.). **Pellagra.**—*Southern Med. Jl.* 1921. Sept. Vol. 14. No. 9. pp. 678–681. (Discussion pp. 681–683.)

The author insists that pellagra is due to the presence of intestinal parasites, chiefly Cercomonas and Trichomonas. He describes a rough chemical test by which, as he asserts, the presence of these parasites can be inferred even though they cannot be seen.

A. D. B.

WOOD (Edward J.). **Acrodynia : Its Place in Medicine and its Relation to Pellagra.**—*Amer. Jl. Trop. Med.* Baltimore. 1921. Sept. Vol. 1. No. 5. pp. 291–310.

The similarity between pellagra and Acrodynia is pointed out and discussed at length. In fact, the author believes that Acrodynia is merely one of the numerous manifestations of pellagra. It appears that even Acrodynia itself has different types, and the following varieties are described :—(1) Peripheral neuritis without digestive disturbances but with erythema on the feet and knuckles. (2) A similar condition with oedema in different areas of the body, together with vomiting and diarrhoea. In some cases a black coloration of the skin was noted, while others seemed to resemble ergotism.

The history of the disease is most carefully discussed and some interesting statements are made, especially the following :—If " pellagra and Acrodynia are one and the same disease and if the epidemic in Moravia in 1577 can be regarded as Acrodynia then pellagra is a much older disease than is usually supposed. In short the first observation of pellagra was not made in 1735 but in 1577. Therefore the disease can have nothing to do with the introduction of maize into Europe."

A. D. B.

CAMURRI (Vincenzo Luigi). **La pellagra nella provincia di Padova dopo la guerra.** [Pellagra in the Province of Padua after the War.]—*Riv. Pellagrolog. Ital.* 1920. Sept.–Dec. Vol. 20. Nos. 5–6. pp. 47–48 ; and 1921. Jan.–Apr. Vol. 21. Nos. 1–2. pp. 5–7.

This paper is an interim report of an enquiry with which the writer was charged by the Italian Government in August, 1919. The object was to determine the influence of war conditions on the pellagra endemic in the province of Padua. In the three years of the war the total number of reported cases increased.

No case of pellagra was found amongst breast-fed infants. Probably a few slight cases escaped observation, though on the other hand many persons were classified as pellagrous that had neither alimentary nor skin symptoms, on account of their complexion, expression and behaviour, or cases of marasmus, chronic enteritis, alcoholic erythema, etc., were called pellagra on account of the state of poverty in which the individuals were found.

J. Rosslyn Earp.

ALPAGO-NOVELLO (Luigi). **Per le Commissioni Pellagrologiche provinciale e per prevenire la pellagra.**—*Riv. Pellagrolog. Ital.* 1921. Jan.–Apr. Vol. 21. Nos. 1–2. pp. 3–4.

The budget of the provincial Pellagra Commissions, in spite of the good record of work accomplished in the last five years, has been inconsiderately reduced from 100,000 lire to one-half that amount. The writer, himself president of the Belluno Commission, points out the grave consequences of this reduction, and claims that money spent by the Commission in promoting the cultivation of beet, grass and wheat instead of the exclusive production of maize, the instruction of the public in the nature of pellagra and similar measures which the Belluno Commission has already undertaken, will make an appropriation for the treatment of pellagra unnecessary.

J. Rosslyn Earp.

AULDE (John). **The Pellagra Outlook.** [Correspondence.] —*Med. Rec.* 1921. Aug. 27. Vol. 100. No. 9. pp. 376–377.

The writer of this letter blames the Government for the presence of pellagra in the United States of America. Apparently he desires that even what a man eats shall be a question for legislation. A letter which was received from a colleague in Florida is quoted at length, and the beneficial effects of colloidal calcium in pellagra are mentioned.

A. D. B.

PUBLIC HEALTH REPORTS. 1921. July 8. Vol. 36. No. 27. p. 1565.—**Economic Depression and Pellagra Incidence.**

Economic depression in America has had an unfavourable effect upon the diet of the people. Animal foods are being reduced while cereals are increasing in amount. It was feared that this unbalanced diet would increase the incidence of pellagra. This fear is apparently well founded, for the number of pellagra cases has increased two-fold in 1921 among the inhabitants of those districts from which information has been forthcoming.

A. D. B.

JORGE (Ricardo). **La question de la pellagre.**—*Bull. Office Internat. d'Hyg. Publique.* 1921. Sept. Vol. 13. No. 9. pp. 940–944.

This paper deals with pellagra in Portugal, where, apparently, the disease is more common than was supposed. The various, more or less accepted, etiological theories are discussed with relation to the conditions obtaining in that country, but no new observations are made.

A. D. B.

CLARK (G. F.). **First Report of Pellagra in Haiti.**—*U.S. Nav. Med. Bull.* 1921. Oct. Vol. 15. No. 4. pp. 813–814.

Three cases of pellagra occurring in Cape Haitien are described as the first ever noted in Haiti. All three pellagrins were females and were treated with "citrated beef blood." One died, another recovered, while the result in the third case is not clearly stated.

A. D. B.

GALBRAITH (J. B. Douglas). **Case of Acute Pellagra in Childhood.**—*Glasgow Med. Jl.* 1921. Oct. Vol. 96. New Ser. Vol. 14. No. 4. pp. 233–239. With 2 text figs.

A case of "typhoid" pellagra in a boy of three years and nine months is described in detail together with the post-mortem report. At first, in view of the nervous symptoms, a diagnosis of cerebellar tumour was made, but later, when diarrhoea, stomatitis and a symmetrical rash on the hands appeared, the case was regarded as one of pellagra. The urine showed no indican and there were no anaerobic organisms found in the stools. Horse serum and whole blood from the parents were injected subcutaneously and salines were administered. The boy died nineteen days after admission to hospital.

Post-mortem examination revealed oedema of the brain, congestion of the spinal cord, with swelling and degeneration of many cells in the anterior cornua, but no definite tract changes, the large intestine congested but not ulcerated. The heart, lungs, spleen, liver and suprarenals were normal, but there was early abscess formation in the right kidney. The diet of the child was apparently sufficient and of the necessary biological protein value.

A. D. B.

McCREADY (J. W.). **A Suggestion for the Treatment of Pellagra.**—*Med. Rec.* 1921. Sept. 3. Vol. 100. No. 10. pp. 417–418.

The author states that the compound of chlorine—Chlorazene—originally called Chloramine T., used by DAKIN in infected wounds provides a successful method of treatment in gastro-intestinal disorders. Chlorazene, he says, is slowly decomposed in the duodenum, liberating a small quantity of free chlorine. An average dose would be Chlorazene gr. $\frac{1}{3}$ with 10 gr. of charcoal in a capsule resistive to the action of gastric juice. This should be given not more frequently than every three hours.

The author has never used this compound in pellagra cases but recommends it to his "Southern brethren" as a possible remedy.

A. D. B.

WYLDER (M. K.). **Some Newer Ideas on Treatment of Pellagra with Report of Two Cases.**—*Southwestern Med.* 1922. Mar. Vol. 6. No. 3. pp. 103–105.

Two cases of pellagra treated with "corn chop" (the husk and germ of corn) are described. One did extremely well, while the other died in a few weeks.

A. D. B.

SULLIVAN (M. X.). **Some Urinary Changes in Normal Individuals on the Pellagra Producing Experimental Diet.**—*Arch. Intern. Med.* 1921. July 15. Vol. 28. No. 1. pp. 119–123.

Six normal people were fed exclusively upon a diet exactly similar to that which in the experiments of GOLDBERGER and WHEELER produced pellagra. The urine in each case was examined quantitatively as regards its main constituents.

Upon changing from a normal diet to the Rankin Farm diet the following urinary alterations were noted. "The average volume decreased; the total nitrogen and the urea nitrogen decreased markedly, the urea nitrogen especially; the ammonia decreased slightly. The ratio of urea nitrogen to total nitrogen was markedly lowered, the ammonia ratio increased."

A. D. B.

SULLIVAN (M. X.) & DAWSON (Paul R.). **Phenols in the Urine in Pellagra.**—*Arch. Intern. Med.* 1921. Aug. 15. Vol. 28. No. 2. pp. 166–172.

The authors give the following summary:—

"The general conclusion as to the phenol excretion of the pellagra patients studied by us, mild cases for the most part, is that there is little variation from the normal either in amount of total phenols or in percentage of conjugation. Only 3 out of 16 patients showed an increase in phenols in the active stage of the disease. There is some evidence that the phenols are increased with increased protein metabolism.

"Of 12 cases tested for indican, 10 gave a marked test. What putrefaction occurs in pellagra on the diets employed seems to take place rather high up in the intestines."

A. D. B.

MISCELLANEOUS.

ZIMMERMANN (Ernest L.). **A Comparative Study of Syphilis in Whites and in Negroes.**—*Arch. Dermat. & Syph.* 1921. July. Vol. 4. No. 1. pp. 75–88.

This paper is full of valuable observations and should be compared with that of BAETZ [this *Bulletin*, Vol. 8, p. 387]. The material was obtained from the Johns Hopkins Dispensary, in which about 60 per cent. coloured and 40 per cent. white patients are treated. In all, 1,843 cases were studied: 596 white males, 521 coloured males, 297 white females and 429 coloured females.

Primary Syphilis.—Of 27 extra-genital chancres, 22, or 6·6 per cent., were in whites as against 1·4 per cent. among coloured patients. HAZEN and THOMPSON state that extra-genital chancres are rare amongst negroes.

Secondary Syphilis.—Glandular reaction in general is more marked in the negro. Thirty-one of the coloured patients complained of pain and only seven white patients; "not infrequently in early secondary syphilis the negro presents symptoms of an intense reaction on the part of the bones and joints, namely, pain with severe nocturnal exacerbation, multiple circumscribed areas of exquisite periosteal tenderness." Of the black patients 12·9 per cent. presented iritis and of the whites 1·8 per cent. Secondary lesions of the buccal and pharyngeal mucous membranes were more common among white than among negro cases. Moist papules and condylomata were much more frequent in the coloured races, especially the coloured female. "The fact that all syphilitic negro women suffer from condylomas at some time may help to explain the greater prevalence of syphilis in this race" [HAZEN].

A table is given showing the general characters of the syphilides according to sex and race. Whereas macular and maculo-papular varieties comprised approximately 70 per cent. of the eruptions in white patients and 35 per cent. in the coloured, pustular syphilides, including both the follicular and the large acuminate pustular varieties, occurred in 24 per cent. of coloured males and in 14 per cent. of black females; only one pustular rash was observed among white patients. "In a number of negroes the eruption and associated fever and malaise aroused the suspicion of variola." The most striking dermatologic peculiarity of syphilis in the negro is the annular papular syphilide; among 228 white patients presenting manifestations of early secondary syphilis typical examples of this lesion were encountered twice, while among 279 negroes it occurred in 40 cases.

Tertiary Syphilis.—The data under this head are given in the table, which repays careful study.

Comparative Incidence of Tertiary Lesions of Syphilis in White and Negro Patients.

	White Males.		White Females.		Coloured Males.		Coloured Females.		White per cent.	Coloured per cent.
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.		
Cutaneous ..	32	11·8	42	27·5	34	13·7	34	15·5	17·5	14·5
Gumma ..	11	4·0	19	12·4	31	12·4	21	9·6	7·1	11·1
Nodular ..	23	8·5	23	15·1	4	1·6	13	5·9	10·9	3·6
Bone	39	14·4	21	13·7	69	27·8	70	32·0	14·2	29·6
Nose and throat	32	11·8	19	12·4	39	15·7	42	19·2	12·1	17·3
Aortitis ..	32	11·8	9	5·9	52	20·9	18	8·2	9·7	14·9
Adenitis ..	3	1·1	3	1·9	6	2·4	17	7·7	1·4	4·9
Iritis	6	2·2	5	3·2	18	7·2	11	5·0	2·6	6·2
Elephantiasis vulvae and stricture of rectum ..	—	—	—	—	—	—	28	12·8	0·0	6·0
Orchitis ..	3	1·1	—	—	9	3·6	—	—	0·7	1·9
Neurosyphilis	155	57·6	36	23·6	71	28·6	28	12·8	45·3	21·0
Tabes ..	85	31·5	9	5·9	11	4·4	3	1·4	22·3	3·0
Paresis ..	15	5·5	4	2·6	4	1·6	—	—	4·5	0·8
Cerebrospinal	55	20·5	23	15·1	56	22·5	25	11·4	18·5	17·3

Whereas the most common cutaneous lesion among white patients is the nodular syphilide, among negroes it is the gumma. These two types of syphilides are believed to represent fundamentally different biologic reactions. Tabes was diagnosed in 94 white and in 14 coloured patients; however, "the negro, in whom the occurrence of tabes at one time was the exception, yearly enters more and more into the competition of modern life and is losing his freedom from this form of syphilis."

The author's summary runs as follows :—

"*Primary Syphilis.*—Extragenital infection is relatively infrequent in negroes. Among colored males and females, the age of infection is respectively one and two years earlier than in white males and females.

"*Secondary Syphilis.*—Secondary syphilis in the negro is characterized by marked polyadenitis, by frequent and severe osteo-arthritic symptoms, by the frequency of iritis, and by the high incidence of follicular and pustular syphilids. A striking racial peculiarity is the frequent occurrence of the annular papular syphiloderm.

"*Tertiary Syphilis.*—Bone syphilis is the most frequent lesion of tertiary syphilis in the negro, exceeding neurosyphilis, which in white patients comprised almost half of all late manifestations.

"Cardiovascular syphilis is more frequent in the negro, with an incidence of two to one in colored and white males, respectively.

"Stricture of the rectum and elephantiasis vulvae are extremely common in the colored female.

"Leukoplakia is rare in the negro.

"Tertiary adenitis is common in the negro.

"Neurosyphilis is more frequent in white patients than in negroes. The negro is less likely to develop tabes or paresis, while the large group of unclassed cases of cerebrospinal syphilis is approximately of equal frequence in the two races. In negroes it is especially likely to manifest itself in the form of cerebrospinal endarteritis.

CONCLUSION.

"In respect to syphilitic infection there exist inherited biologic differences between white and negro patients. The negro develops intense reactions on the part of cutaneous and osseous structures, and is relatively free from tabes and paresis. In white patients, syphilis more frequently runs its course with skin manifestations slight or absent, but there is a greater tendency toward the eventual development of tabes or paresis."

A. G. B.

PIJPER (Adrianus). **Syphilis among the Coloured Population of Pretoria: A Record of 500 Wassermann Reactions.**—*S. African Med. Rec.* 1921. Aug. 27. Vol. 19. No. 16. pp. 302–305.

After some remarks on the value of a positive Wassermann as indicating syphilis, and on the lack of information as to the spread of the disease among the coloured population around Pretoria, the author gives the results of the blood test in the case of 500 specimens obtained, chiefly in the out-patient department, at the Pretoria hospital. The great majority were pure natives, the rest Asiatics, half-castes and various mixtures. Such cases as were *prima facie* syphilitic were excluded. Notwithstanding the venue of the samples the author believes that they represent fairly well the total coloured population of Pretoria and its surroundings. The technique was that of WASSERMANN, as given in KOLLE and WASSERMANN's Handbuch.

The results were as follows:—

	Number.	*Percentage.*
Strongly positive (+ + + +)	184	36·8
Positive (+ + +)	55	11·0
Weakly positive (+ +) ..	47	9·4
Dubious (+ —)	35	7·0
Negative (— — — —) ..	177	35·4
Autofixation occurred in ..	2	0·4

Disregarding all but the strongly positives it is concluded that 184 of 500 coloured people, or 36·8 per cent., are syphilitic.

The author points out the dangers to the white community, as many of these cases are employed as houseboys and housemaids, and also to the coloured people themselves. He quotes from LIVINGSTONE to the effect that syphilis tends to die out in pure bred Africans, but considers that there is no evidence for or against this belief.

A. G. B.

BRISCOE (Cornelius D.). **Syphilitic Hepatitis.**—*Proc. Med. Assoc. Isthm. Canal Zone.* 1918. Jan.–June. Vol. 11. Pt. 1. pp. 45–47.

Negro labourers were admitted to Ancon hospital with the following symptoms: mental apathy, yawning, fever, accelerated pulse, moderate

jaundice, pain and tenderness over the liver. In the early part of the attack there was loss of appetite, slight nausea and, rarely, vomiting. Liver abscess was first thought of and was not excluded by a leucocyte and differential count. All had, however, some sign or symptom of syphilis. The Wassermann reactions were positive and intensive syphilitic treatment led to a fall of temperature and subsidence of symptoms. An account of hepatic syphilis is given from LINDSEY and from OSLER.

A. G. B.

CHRISTIDI (Ch.). **La syphilis en Perse à travers les siècles.**—*Presse Méd.* 1922. Mar. 15. Vol. 30. No. 21. pp. 425–426.

The author tells us that he has seen in Persia baked earthenware plaques on which the symptoms of syphilis were inscribed, such as oral sores, hoarseness, severe headaches, proving that syphilis was widespread at that date and that the disease in Asia was propagated by Phoenician merchants. Arab manuscripts of 450 B.C. found near Ispahan describe, and confound, leprosy and syphilis. The disease to-day is mild and the lesions clear after a few injections of a mercurial. Amongst 3,000 syphilitic patients not more than 50 followed regular treatment, but after the second or third year, he states, the Wassermann was feebly positive or was negative. No parasyphilitic sequela was seen in a Persian, though the upper classes are brain workers and use alcohol as well as opium. Europeans infected from Persian women had the disease lightly, whereas those infected from non-Persian women suffered grave and persistent infections; two among 20 such had general paralysis. The author states, on the authority of bacteriologists in Persia, that treponemata examined in Persia are "degenerated," are shorter than those examined in Europe, and usually have fewer spirals.

A. G. B.

LEMANN (I. I.). **Diabetes mellitus, Syphilis in the Negro.**—*Amer. Jl. Med. Sci.* 1921. Aug. Vol. 162. No. 2. pp. 226–230. With 2 charts in text.

WARTIN (*Amer. Jl. Med. Sci.*, 1916) concluded from the evidence of all his diabetes autopsies at Michigan that in diabetes, when it is due to pancreatitis, syphilis is an antecedent factor, although syphilitic pancreatitis did not always present the clinical symptoms of diabetes. The present author, converting this limited proposition into the universal proposition that syphilitic pancreatitis is the common cause of diabetes, argues that if this were so then in the Southern United States diabetes should be much commoner among the negroes, whose general syphilization is notorious, than among the whites. His statistics from the Charity Hospital at New Orleans show, however, that during 22 years the percentage of diabetics among negroes is only 30, whereas among whites it is 70. He concludes, therefore, that either there is no causal connexion between syphilis and diabetes, or [more justly from the premises] that there exists an unexplained immunity of the negro race to pancreatic manifestations of syphilis just as there exists an unexplained immunity of that race to locomotor ataxic manifestations.

A. Alcock.

LEMANN (I. I.). **Diabetes Mellitus in the Negro Race.**—*Southern Med. Jl.* 1921. July. Vol. 14. No. 7. pp. 522–525.

An analysis of the cases of diabetes admitted to the Charity Hospital (?) New Orleans, for the period 1910–19 showed 135 to be whites and 59 to be negroes. The admissions were 92,000 and 68,000 respectively, so that the negroes furnished 43 per cent. of the admissions but only 30 per cent. of the diabetics.

A. G. B.

SUR (Taraknath). **Broncho-Moniliasis.**—*Indian Med. Gaz.* 1921. Dec. Vol. 56. No. 12. pp. 445–449. With 1 chart and 2 coloured plates.

A European in England after many years' service in India contracted bronchitis in April, 1920, followed in the course of the next twelve months by two attacks of pleurisy, frequent asthma, evening fever, blood-stained expectoration and, besides other symptoms, loss of a stone and a half in weight and incapacity for work. Tubercle bacilli could not be found (number of examinations not stated). In July, 1921, during an attack of pleurisy and pneumonia in India the sputum was found to contain a Monilia. Potassium iodide, 20 gr. thrice daily, increased to 45 gr., was given with four injections of an autogenous vaccine prepared from cultures of the Monilia. He quickly recovered and at the time of writing was well. The characters of the Monilia are given; it corresponds with *M. tropicalis* Castellani. To explain the onset in England the author suggests the patient was a carrier of the infection, which manifested itself after a chill.

A. G. B.

COLARES (J. V.) & GUIMARÃES (Ugo Pinheiro). **Um caso de micose pulmonar.**—*Arch. Brasileiros de Med.* 1921. Apr. Vol. 11. No. 4. pp. 288–290.

An account of a case of pulmonary mycosis in a negro woman of 24. The disease commenced about a year before the patient came under the authors' observation by pricking sensations under the left breast. These were soon followed by pains of rapidly increasing severity in various parts of the chest, aggravated by the movements of respiration and accompanied by a dry cough. Later on there was blood-stained expectoration to which succeeded definite haemoptyses. Other symptoms were fever, chiefly vespertinal, headache and a marked feeling of weakness, which contrasted with the patient's generally well nourished condition. Examination of sputum for T.B. and Wassermann reaction both negative. The patient's occupation involved the constant handling of grains, flour and bran. On a provisional diagnosis of pulmonary mycosis the patient was given endovenous injections of potassium iodide, under which her condition rapidly improved. The diagnosis was confirmed by the finding of *Aspergillus fumigatus* in the patient's sputum.

F. S. Arnold.

FARAH (Najib). **La moniliase bronchique en Egypte.**—*Presse Méd.* 1921. Sept. 7. Vol. 29. No. 72. pp. 713–716. With 2 text figs.

The paper, based on four cases seen by the author in Egypt, deals with all aspects of the disease and its parasitic cause. The organism

in each instance was *Monilia Pinoyi* Castellani. Cultures injected into the veins of rabbits caused an acute infection with Monilia with death on the sixth day; and sections of the lung and kidney showed the presence of the fungus. A case in which death resulted is detailed at considerable length. The treatment advised is injectable iodine in the form of lipoidol, introduced into the gluteus muscle. In the author's cases the fungus disappeared from the sputum after the third injection.

A. G. B.

SARTORY (A.) & MOINSON (L.). **Sur un cas de moniliase bronchique.**—*C.R. Acad. Sci.* 1922. Jan. 3. Vol. 174. No. 1. pp. 77–79.

The patient was a man of 38, resident in Paris, who for two months had suffered from cough with expectoration of blood. His appearance and the results of the physical examination suggested phthisis. Tubercle bacilli were not found in the sputum, but rounded or oval cells which were cultivated and determined as *Monilia Pinoyi* Castellani. The cultural and biochemical characters of the fungus are described. The intravenous inoculation of pure culture to a rabbit resulted in a generalized mycosis. The fungus was found in sections of the lungs and kidneys. The patient was treated with injectable iodine (huile iodée) and four months later appeared to have recovered. The Monilia could no longer be found in the sputum.

A. G. B.

MENDELSON (Ralph W.). **Pulmonary Tuberculosis, Pulmonary Mycosis and Pulmonary Spirochetosis.**—*Milit. Surgeon.* 1921. July. Vol. 49. No. 1. pp. 81–82.

The author, who is Principal Medical Officer of Health to the Royal Siamese Government, states that on careful examination of the weekly health returns of the city of Bangkok it is found that from 17 to 33 per cent. of the deaths are reported as due to tuberculosis of the lungs, but careful examination and observation of pulmonary cases applying for treatment at one of the local charitable institutions showed that 25 per cent. are mycotic or spirochaetal; and of those diagnosed as tuberculosis only 10 per cent. can be confirmed bacteriologically.

Symptomatically these three conditions cannot be differentiated. Diagnosis is made in the laboratory and tuberculosis is ruled out only after animal inoculation. Moniliasis will be proved by a glucose agar culture made with proper precautions, and spirochaetosis by direct examination of slides, silver nitrate being the most useful stain. Treatment for these two infections is by iodides and by arsenic. Differentiation of the three conditions discussed is of great importance.

A. G. B.

MENDELSON (Ralph W.). **Experimental Pulmonary Mycosis in Guinea-Pigs.**—*Jl. Trop. Med. & Hyg.* 1921. Nov. 15. Vol. 24. No. 22. pp. 292–294. With 4 text figs.

Pulmonary mycotic infections are widely prevalent in Siam. Though a variety of moulds have been recovered the symptoms do not differ. One of these has been cultivated and used to produce

an experimental infection in guinea-pigs, which were kept under observation for a month. They showed no signs of illness when killed. The lungs were found to contain tumour-like masses consisting of connective tissue with no tendency to break down. Microscopically a number of solid or semi-solid areas were demonstrated, some of the vesicles containing red cells, a few including mononuclear leucocytes. The capsule of the enlarged peribronchial lymph nodes was greatly thickened and contained a mass of polymorphonuclears only partly filling the cavity. Mycelium was not seen but conidia were present in many areas. Two monkeys were infected but remained well. The author considers pulmonary mycosis to be of great importance: it is incapacitating but preventable. Figures show the naked eye and microscopic appearances of the guinea-pigs' lungs.

A. G. B.

MACFIE (J. W. S.). **Notes on Some Fungal Infections in West Africa.** —*Ann. Trop. Med. & Parasit.* 1921. Sept. 30. Vol. 15. No. 3. pp. 271–282.

This paper is in four sections, two describing fungi of the genus *Monilia* recovered from patients suffering from diarrhoea, the third describing a case of otomycosis and the fourth a case of tonsillar nocardiomycosis, all observed at Accra.

"No evidence is brought forward in support of the view that the species of Monilia described . . . were the sole cause of the dysentery and diarrhoea with which they were associated . . . but it is maintained that they were the cause of some of the symptoms."

The first case was that of a European with dysenteric diarrhoea; no amoebae could be found, but Morgan's bacillus was isolated. The Monilia obtained resembled *M. tropicalis* Castellani, and was close to *M. accraensis* [this *Bulletin*, Vol. 18, pp. 295–96.] The cultural characters and biochemical reactions are given, with a table.

The natives of Accra suffer from a well-defined form of persistent diarrhoea which some consider to be akin to sprue.

"The stools are bulky, frothy, and generally canary-yellow coloured; the tongue is red, fissured, and eroded; and the patients are wasted—a condition which is often masked by oedemas of the limbs and by ascites. The faeces in such cases usually teem with yeast-like cells . . . stages of fungi of the genus *Monilia*."

Two cases are described here; one of the fungi cultivated belonged to the *Pseudolondinensis* group, the other to the *Krusei* group of CASTELLANI and CHALMERS. The names *Monilia africana* and *M. enterocola* are proposed.

The case of otomycosis, in a lady, caused pain and irritation in the ear; the condition was relieved and apparently cured by an application containing salicylic acid. The fungus appeared to belong to the genus *Sterigmatocystis*.

The case of tonsillar nocardiomycosis was that of a European with a number of small white concretions in crypts of both tonsils. There was no pain or discomfort. Scrapings consisted mainly of fungal hyphae. Inoculations on agar and glucose agar were unsuccessful. The condition is figured in CASTELLANI and CHALMERS' book.

A. G. B.

MACFIE (J. W. S.) & INGRAM (A.). **A Fungus of the Genus *Nocardia* Cultivated from Heart Blood.**—*Ann. Trop. Med. & Parasit.* 1921. Sept. 30. Vol. 15. No. 3. pp. 283–285.

The fungus described was cultivated from blood withdrawn from the heart at the autopsy of a native who died at Accra of an obscure complaint. Both lungs were affected with bronchopneumonia but nothing else definite was found.

The cultural characters and biochemical reaction are described. Growth was almost restricted to potato and media containing either blood serum or ascitic fluid. The authors believe the fungus to be a new species and propose the name *Nocardia cruoris.*

A. G. B.

GALE (A. M.). **Some Points in the Epidemiology of an Outbreak of Cerebro-Spinal Fever in Hong Kong, 1918.**—*Jl. of Hyg.* 1921. Nov. Vol. 20. No. 3. pp. 289–318. With 3 charts, 2 maps and 1 fig.

Though the epidemic of cerebro-spinal fever in Hong Kong in 1918 was not recognized till February, the death returns suggest that the disease was present previously, probably from 1914 onwards. The epidemic was immediately preceded by widespread catarrhal pharyngitis, and by the reporting of 12 cases of haemorrhagic smallpox; as there were no ordinary cases of this disease in the Colony it may be assumed that these were cerebrospinal fever and the same conclusion applies to a number of cases in January returned as typhoid fever, though the Widal reaction had been consistently negative.

The records of the epidemic were taken from February to June, when it was on the wane, and include a total of 1,040 cases; March was the month of greatest incidence. The number of deaths was 889, including 519 brought in dead or *in extremis*, a mortality of 85·48 per cent., but many cases were concealed, or so mild that they escaped detection. A large number of cases occurred in the practice of the local doctors presenting "headache, sickness, stiffness of neck, varying degrees of prostration, and complaint of dazed sensation." These recovered completely without diagnosis. The addition of such would lessen the percentage mortality. Graphs show that of the 1,040 cases 318, or 30·5 per cent., occurred in children of five and under, with a mortality of 96·5 per cent., and 42 per cent. were among children under ten. The susceptibility then diminished gradually to old age, when there was a slight increase. There were only four cases in Europeans.

A chart shows the daily number of cases and its relation to the meteorological conditions. The curve of the daily incidence follows a remarkably wavy course, with four high peaks representing an incidence of over 20 cases per day. Certain meteorological conditions were constant for each of these peaks. It was preceded at an interval of three days, early in the epidemic, to seven, later, by a drop in the temperature, which was steadily maintained and accompanied by saturation of the air and absence or diminution of sunshine; rainfall showed no appreciable effect.

The next section concerns the geographical distribution of the cases and overcrowding. The estimated population of Hong Kong and Kowloon in 1917 was 535,000—521,000 Chinese—but the migratory

population is immense ; it is estimated for the same year that 1,321,000 arrived and 1,250,000 departed. Even this does not include the families which come and go in junks and sampans.

The city of Victoria is believed to have an average density of 350 persons per acre, and there are three health districts with respective densities of 863, 981 and 1,000 persons per acre. "It is highly probable that Hong Kong in the next census will head the list for overcrowding in any British community." The housing conditions have been bad since 1902, when C. CHADWICK reported on them—too many houses on too small a space, sanitary defects in their design, overcrowding in the houses themselves, rooms badly lit and divided up into cubicles. From figures collected by the author from patients it appears that 16·7 per cent. of the floors contained 16-20 inhabitants per floor, and 6·9 per cent. 21 25 inhabitants per floor. The floor area per person was in many instances inadequate and below the scale of the Public Health Ordinance of Hong Kong, namely 30 sq. ft. A spot map shows that the three health districts referred to above as the most grossly overcrowded yielded the largest number of cases.

As to the habits of the Chinese, it need only be mentioned that they clear the naso-pharynx by way of the mouth and expectorate profusely indoors as well as outdoors.

Figures were obtained of the length of residence in the Colony of the 1,040 patients : 9·5 per cent. became infected in their first week, 4·8 in the second, 10·0 in the third, and 13·6 in the fourth, or 37·9 per cent. in the first month ; 7·1 per cent. had been resident three days or less. Case incidence is high in recent arrivals, just as in armies it is in the fresh recruits (FLEXNER), and the migatory character of the population ensures a constant supply of susceptible persons. It was not practicable to make a routine search for carriers, chiefly owing to insufficiency of staff and anticipated objections from the Chinese. Moreover, if found they could not be isolated during the early stages of the epidemic. For contacts a portable atomizer, which is illustrated, was supplied to the sanitary inspectors. The solution used was one per cent. zinc sulphate and the infected house was visited for five days in succession. All the inmates were thus treated and instructed to gargle with a patent disinfectant available in the Colony. The author expresses no opinion of the value of the atomizer as a disinfectant, but "they served the useful purpose of a panacea for the panic-stricken." In Hong Kong, however, the recognition and isolation of carriers played no part in checking the epidemic. The author suggests as most practical a screen of transparent celluloid extending from the hat-brim to a little below the chin. This would be compulsory wear for known carriers.

A. G. B.

i. HOEY (Matthew J.). **Recent Outbreak of Meningitis and its Management.**—*Proc. Med. Assoc. Isthm. Canal Zone.* 1918. July–Dec. Vol. 11. Pt. 2. pp. 33–36.

ii. TEAGUE (Oscar), BATES (Lewis B.) & MCFARLAND (William L.). **The Bacteriological Examination for Meningococcus Carriers at the Balboa Quarantine Station following the Recent Outbreak of Meningitis among Japanese Steerage Passengers on the Steamship "Anyo Maru."**—*Ibid.* pp. 39–45.

i. A Japanese steamer reached Balboa on May 7, 1918, having left Hong Kong 45 days before and called at several ports. It carried

500 Japanese immigrants, 101 Chinese and other steerage passengers, and 61 first and second cabin passengers. Cases of meningitis had probably occurred from April 11 onwards, all fatal, but diagnosis was rendered difficult by a synchronous epidemic of influenza. In all seven deaths were reported, five probably due to meningitis. Segregation and isolation were carried out on board with fair efficiency and no cases occurred among cabin passengers or crew. The ship left Balboa on May 11 and returned on the 27th, having been refused permission to land passengers at Callao, Peru. Seven more cases of meningitis had developed, with three deaths.

The passengers were landed and isolated in several groups. The cases were energetically treated in the isolation hospital, no more deaths occurred and only three fresh cases, all within 48 hours. No carriers were found among the crew but amongst the rest the proportion was high, exceeding at one time 10 per cent., and some persons who at first gave negative cultures afterwards qualified as carriers. Though isolation of carriers as individuals was impossible, no clinical cases appeared. It was decided to release the carriers after two consecutive negative cultures, and 95 per cent. were discharged within 60 days.

ii. Details of the examination for carriers are given—the preparation of the ascitic-fluid-agar, the obtaining of swabs and cultures at the rate of 75–100 per hour by two experts and three assistants, and the subsequent manipulations. The results appear in a series of tables. Excluding the first class passengers, who were well isolated and none of whom was found positive, there were 126 persons positive for meningococci out of 568, or 22 per cent. ; 71, or more than half, were detected in the first two weeks. There was then an average of about 16 per week of fresh carriers for three weeks, after which very few new positives were discovered, but positive examinations are recorded over the whole period from May 31 to September 23.

" The outstanding feature," the authors write, " of these results is that the examination of a large group of men living in intimate contact and the isolation of those found positive for meningococci does not prevent the development of carriers among those remaining. The complete elimination of carriers is most difficult to accomplish even by repeated examinations at short intervals."

As recorded by Hoey there were no new cases of meningitis. Details are given of five chronic carriers, three of whom were detected at the beginning and were still positive when discharged on September 23.

A. G. B.

PELTIER & CAVAZZA. **Épidémie de méningite cérébro-spinale à bord du** *Roberto-Figueras*, **transportant un convoi de coolies Annamites.** —*Ann. de Méd. et de Pharm. Colon.* Paris. 1921. Apr.–May–June. Vol. 19. No. 2. pp. 188–192.

The story is told of a steamer which left Haiphong on July 6 for New Caledonia with 990 Annamite coolies, many of them ailing, crowded together in a confined space without possibility of isolation in case of sickness. All went well till the 14th, when there were complaints of fever, and on the two following days two coolies died in coma. By August 1, when the ship reached Townsville, there had been eight deaths and on the following day at the anchorage, eight died on board. Here the diagnosis of cerebro-spinal meningitis was bacteriologically confirmed, and 31 patients were put ashore. The ship sailed on the 4th, and reached Nouméa on the 10th, at which date 20 coolies had the

disease. The sick and the healthy were now segregated and the latter, with the crew, were submitted to periodical disinfection of the pharynx and nasal fossae. The crew remained free from disease and no carriers could be detected amongst them.

The net result was that 65 coolies were attacked and 28 died. The authors suggest that the epidemic was due to exaltation of the virulence of meningococci carried by healthy persons, under the unfavourable conditions of the voyage.

A. G. B.

DE MELLO (Froilano). **Une épidémie de méningite cérébro-spinale dans l'Inde Portugaise.**—*Bull. Soc. Path. Exot.* 1921. July 13. Vol. 14. No. 7. pp. 398–405.

According to the author, cerebrospinal meningitis was first reported from India by ROBERTSON MILNE in 1906 [earlier records are those of Vandyke CARTER (1882) and DIMMOCK (1884) (CASTELLANI and CHALMERS)].

The disease made its appearance in Portuguese India in 1918, but was not recognized for some time, till the author obtained by lumbar puncture the specific organism. Kernig's sign was absent: there was no labial herpes, nor tache, nor contracture of the neck; in grave cases rather paresis of the head. Abortive forms, limited to an attack of vomiting or a loose stool with slight meteorism, were frequent. In some districts 60 per cent. of the inhabitants were attacked, mostly children below the age of six. The mortality did not exceed 18 per cent. In the single autopsy which was made the brain lesions were those of diffuse haemorrhagic meningo-encephalitis. It is noted that in some districts the appearance of meningitis was preceded by veritable epidemics of adenitis, to which no importance was attached.

No elaborate bacteriological investigation could be made, but sufficient was done to identify the organism found as the meningococcus of Weichselbaum.

A. G. B.

WATKINS. [**Treatment of Cerebro-Spinal Meningitis: Diagnosis and Treatment.**]—*Proc. of the* [*Transvaal*] *Mine Med. Officers' Assoc.* 1921. June. Vol. 1. No. 3. pp. 8–12. (With discussion.)

Points emphasized in this paper are the cogency of early diagnosis, the supreme necessity of slowness and caution in performing lumbar puncture, and the employment of an authentic serum in sufficient quantity.

In the operation for lumbar puncture a syringe is never used. The spinal needle being introduced, about 85 drops (5 cc.) of fluid are first collected at the rate of about 20 to 25 drops a minute, from which two smears are made for confirmatory diagnosis. If the diagnosis is confirmed more fluid is slowly run off, up to 50 or 60 cc., if possible, the amount being determined by the state of the pulse. The serum is then allowed to flow in gently through the spinal needle, and when the operation is completed the foot of the bed is raised about nine inches for six hours so that the serum may find its way to the patient's brain. The amount of serum introduced is 50 cc., and six hours afterwards a dose of 25 cc. is injected intravenously. On the next day 50 cc. are again introduced intrathecally and 25 cc. intravenously, and on the third day 50 cc. intrathecally only. Then, after an interval of

three days, injections are repeated as symptoms indicate, though it has to be borne in mind that mere rise of temperature may be caused or increased by injections and will yield to one or two full doses of aspirin.

The serum prepared at the South African Institute of Medical Research seems to be very efficacious: in nine cases treated in 1920 only one death occurred: it is made from material collected at the mine hospitals and so is almost autogenous.

A. A.

LISTER (Spencer). **The Laboratory Aspect of Meningococcal Meningitis, with a Brief Review of Infection and Immunity.**—*Proc. of the [Transvaal] Mine Med. Officers' Assoc.* 1921. June. Vol. 1. No. 3. pp. 1–8. With 2 text figs.

This is a fine summary dealing with the biological principles of immunity in general and with the natural and experimental history of the meningococcus and of anti-meningococcal serum, and with the manner in which the organism is "carried" and spread.

A. A.

i. MACCALLUM (W. G.) & MOODY (L. M.). **Alastrim in Jamaica.**—*Amer. Jl. Hyg.* Baltimore. 1921. July. Vol. 1. No. 4. pp. 388–409. With 9 plates.

ii. MOODY (L. M.). **Alastrim; or, Kaffir Milk Pox.**—*Ann. Trop. Med. & Parasit.* 1922. Mar. 31. Vol. 16. No. 1. pp. 21–46. With 3 charts and 5 plates.

i. This paper is a valuable contribution to the subject of Alastrim—the text as well as the nine beautifully clear photographs of patients illustrating the rash. The symptoms and course of the disease, the histological changes in the skin, the relation of vaccination to alastrim, are retailed or discussed.

Dr. MacCallum spent only ten days in Jamaica, in September, 1920, but Dr. Moody, the Government Bacteriologist at Kingston, had been studying the clinical phenomena since May, when the epidemic began. In 202 cases the incidence of the symptoms of onset was as follows:—

Headache in 172 cases	85 per cent.
Pain in back in 111 cases [severe only in 45]	54 ,,
Pain in limbs in 41 cases	20 ,,
Vomiting in 32 cases	15 ,,

The characters of the eruption are minutely described. Pustulation and crusting occur but there is no noticeable odour about the patients, a point which medical officers in the tropics who have had to visit small-pox hospitals will readily appreciate. Of 2,333 cases reported only ten died: three were children who contracted the disease shortly after birth, and four were women pregnant 6–7 months, who displayed a decided tendency to hæmorrhage. Two macerated foetuses, born a month after the mother's attack, had what appeared to be pocks on the skin and, which seems more remarkable, two women gave birth to full-term infants showing an unmistakable eruption of alastrim though neither mother had had the disease and both had been vaccinated 4–6 weeks before delivery.

The earliest stage of the rash studied histologically was from skin excised on the third day; the authors think that study of an earlier stage is desirable. Section shows an intense inflammatory reaction in the corium, though the changes in the overlying epithelium are only in their inception. It is concluded that the infective agent begins its activity in the corium and it is considered improbable that the hypothetical organism is a parasite of the epithelium. The general opinion of observers is that alastrim confers little immunity from vaccination with cowpox, but it is noted that variola protects against vaccinia in only 50 per cent. A table of 44 cases in non-vaccinated children, 26 in those with scars of successful vaccination and six with a history of such vaccination but no scars, classed in each instance as severe, medium and mild cases, shows that more than half the cases in the non-vaccinated were severe or medium, whereas only six of the remaining 32 come in this category. In spite of vaccination there were many alastrim cases in children, but figures of vaccination of contacts show that it gives a large measure of protection, which, in the authors' opinion, must be held to be evidence of the extremely close relationship of variola and alastrim.

Sixty cases were vaccinated after recovery from alastrim; in the 45 who "took" the following phenomena were noted: tardy development and slow course of the lesion, small size of the vesicles, exuberant base and imperfect umbilication, insignificance of the local and constitutional reaction. The authors were entirely unsuccessful in transmitting the disease, in however localized a form, to rabbits or calves.

In their final discussion the authors remark that the dogmatic conclusion found in most text-books, to the effect that vaccinia is merely small-pox attenuated and permanently altered by passage through calves, is unjustified. The uncertainty of this relation, not to be resolved till the organisms concerned are isolated in pure culture, concerns also that between small-pox and alastrim. On account of the extraordinary variation in severity in what has been regarded as true small-pox the distinction is rendered still more difficult: mild cases of small-pox often show only a few scattered pocks and slight fever, whereas in alastrim the initial fever is high and the body is covered with pocks.

The practical conclusion is that the spread of the disease is restricted by prompt vaccination and revaccination. [See LEAKE and FORCE, this *Bulletin*, Vol. 18, p. 293.]

ii. An account of the same epidemic covering, in part, different ground and illustrated by another series of excellent photographs. The study is based on 2,912 cases which passed through the Isolation Hospital at Kingston. In those cases in which a definite history of exposure was obtained the incubation period was from 10–14 days. A rise of temperature was constant. The eruption appeared with equal frequency on the 3rd and 4th day. Of the 202 cases tabulated in (i) the location of the rash at the onset was as follows:—

Face	120
Wrist and forearm	52
Both arm and face	27
Scrotum	1
Inner side of knee	1
Elbow	1

The rash tends to affect the face, lower half of back, arm and forearm, especially towards the wrists; it is also seen on the scalp, in the mouth and larynx and invariably on the palms and soles.

The virus passes fairly readily into the foetal circulation, for in 20 cases admitted after an attack of alastrim into the Maternity Hospital there were eight instances of abortion at about the sixth month and in each the macerated foetus was scarred. In two cases fully investigated the Wassermann was negative. Only eight of the 20 mothers produced normal babies. The author discusses at greater length the instances in which the infant was born with alastrim though the mother had shown no sign of the disease; he admits the possibility of generalized vaccinia but is rather of opinion that they illustrate the transmission of alastrim from immune mother to unborn child.

A. G. B.

WATKINS (V. E.). **The Relationship of Alastrim to Smallpox.**—*Med. Record.* 1921. Dec. 31. Vol. 100. No. 27. (Whole No. 2669). pp. 1149–1151.

During 1920 alastrim entered Santo Domingo from Haiti, the western third of the island [see this *Bulletin*, Vol. 18, p. 292], and gradually spread eastward. Before it arrived a campaign of vaccination was instituted on the author's plantation, and to this is attributed the fact that of 7,000 possible victims only 88 contracted the disease. Children seemed to be relatively immune. In all cases where the date of exposure could be fixed the incubation was 21 days. The account of the symptoms presents nothing novel except that many of the cases had secondary fever, reaching in confluent cases 104°. Bad cases showed considerable pitting about the nose and cheeks. There were no deaths. The author concludes that the disease is smallpox and is best known under that name, and he asserts in explanation of its mild character that "no infectious or contagious disease runs true to form in the tropics except pulmonary tuberculosis."

A. G. B.

HOFFMANN (W. H.). **The Diagnosis of Variola by Inoculation of the Cornea of the Rabbit.**—*Med. Record.* 1921. Nov. 26. Vol. 100. No. 22. (Whole No. 2664). pp. 936–938.

Variola of a very mild type, and consequently difficult to diagnose, has recently been introduced into Cuba from Haiti and Jamaica. A simple practical test, devised by PAUL, depends on the fact that if superficial lesions are produced on the rabbit's cornea and infected with the virus of variola, 24–36 hours later the epithelium at the site of the inoculation proliferates; the proliferation spreads to the surrounding tissues and is followed by desquamation of epithelium in the central parts.

The author performs the test as follows:—

"A small quantity of the secretion from a suspicious pustule is removed by a small knife or needle, previously sterilized in the flame, and placed on a sterilized slide, cleansed by alcohol. The slide is put in a Petri dish and allowed to remain for some time. The dried secretion may be used

for the test, as it has only to be moistened at the moment of inoculation of the animal, and for which either Ringer's solution or a few drops of a 50 per cent. glycerine solution in water may be used. . . . .

"The rabbit to be used may be of any kind or size. The cornea may be anesthetized by a cocaine solution, but it is not absolutely necessary. The animal may be wrapped in a towel, all but the head, to ensure greater ease in technique, and then held down on the table by two of the operators.

"With a small sharp steel needle, previously sterilized by flame, there are made from 3 to 5 superficial horizontal incisions across the epithelium of the cornea of the eye, and as many in a vertical direction, crossing the first group of lines. It is not difficult to hold the eye open and fixed with the left hand, while with the right hand the above-described operation can be performed in a few seconds. Following this, a quantity of the secretion to be tested is then placed on the surface of the cornea with a small, blunt, properly sterilized instrument, and thoroughly distributed by a closing movement of the eyelid. The inoculated animal is then placed in a cage and treated as a highly contagious case.

"If no specific, variolic infection of the cornea has taken place, the small traumatic lesions will be healed in twenty-four hours; and after forty-eight hours the cornea will appear absolutely clear and without irritation. If, however, the eye has become infected with variola virus there will appear on the cornea, from thirty-six to forty-eight hours after injection, certain lesions which may be visible to the naked eye, but are much more clear under a low power lens. A definite irritation of the eye and some slight grayish epithelial prominences will be seen on the surface of the cornea.

"Forty-eight hours after inoculation the rabbit is killed by a blow in the neck in all cases, irrespective of reaction. The eye which has been used for the experiment is enucleated with great care by the method used in ophthalmological work, cutting through the external muscles and the optic nerve. The bulb is immediately placed in the alcoholic sublimate solution already detailed*, and fixed for from one to two minutes. Then the cornea is separated from the eye in a line near the limbus with a small Graefe knife or fine, sharp, iridectomy scissors. Any pressure on or lesions to the corneal tissue should be avoided.

"The cornea, lying in the solution, may then be inspected with a lens. If infection has taken place there will appear along the criss-cross lines previously made small, isolated circumspect prominences of a porcelain-white color, and which contrast sharply with the rest of the cornea which presents a diffuse grayish opacity. The prominences may be confluent when a secretion of great virulency has been used for inoculation. . . . .

"Forty-eight hours after infection has taken place, there will be found in the center of the variolic proliferation, which is still progressive in the peripheral parts, a desquamation of the epithelial cells; and after ninety-six hours there will be developed a round crateriform depression with a very sharply defined rim. This type of proliferation is pathognomonic of variola. These macroscopical lesions are so characteristic of variola that they allow of an undisputed diagnosis of this condition. For scientific purposes, however, the diagnosis can be confirmed by the histological examination."

For details of the histological examination the paper must be consulted. A positive reaction is diagnostic of variola, and variola virus gives a positive result in 90 to 95 per cent. of cases. A negative result, however, is not conclusive. Varicella does not give the reaction. No reference is made to alastrim.

A. G. B.

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* Four gm. of sublimate, 30 cc. of 98 per cent. alcohol, and 60 cc. of distilled water.

i. Francis (Edward). **Tularaemia Francis 1921. i. The Occurrence of Tularaemia in Nature as a Disease of Man.**—*Public Health Rep.* 1921. July 29. Vol. 36. No. 30. pp. 1731–1738.

ii. —— & Mayne (Bruce). **ii. Experimental Transmission of Tularaemia by Flies of the Species** *Chrysops discalis.*—*Ibid.* pp. 1738–1746.

iii. —— & Lake (G. C.). **iii. Experimental Transmission of Tularaemia in Rabbits by the Rabbit Louse,** *Haemodipsus ventricosus* **(Denny).**—*Ibid.* pp. 1747–1753.

iv. —— & ——. **Transmission of Tularaemia by the Bedbug,** *Cimex lectularius.*—*Ibid.* 1922. Jan. 20. Vol. 37. No. 3. pp. 83–95.

v. —— & ——. **Transmission of Tularaemia by the Mouse Louse,** *Polyplax serratus* **(Burm.).**—*Ibid.* pp. 96–101.

vi. ——. **Cultivation of** *Bacterium tularense* **on Mediums New to this Organism.**—*Ibid.* pp. 102–115.

vii. —— & Lake (G. C.). **Six Cases of Tularaemia occurring in Laboratory Workers.**—*Ibid.* Feb. 24. No. 8. pp. 392–413. With 2 charts.

i. Tularaemia is a specific disease due to infection with *Bacterium tularense* [see this *Bulletin*, Vol. 5, p. 404, and Vol. 15, p. 21]. As at present observed it occurs in certain rural parts of Utah in the summer months (June–August), and being a severe fever of a septic type, from which convalescence is protracted, it seriously disables the patient at his busiest season. Fatal cases have been reported.

The observations and experiments recorded in this paper show that the infection is derived from rodents (chiefly, it would seem, the jack rabbit) in which it is kept going by blood-sucking ectoparasites (chiefly, it would seem, the rabbit louse, *Haemodipsus ventricosus*). In rodents it appears to be a serious or fatal infection, causing buboes and typical changes in the spleen and liver.

They show also that the infection is imparted from rodents to man by blood-sucking insects (chiefly, it would seem, *Chrysops discalis*). In man the infection quickly spreads from the site of the bite, causing painful lymphangitis and adenitis, which commonly goes on to suppuration and requires surgical treatment; there is also fever of sudden onset, and prostration. Recovery is slow, taking from six weeks to three months; one of the seven cases here reported had a fatal ending on the 26th day, the bite having been on the neck and the adenitis extending to the mastoid region.

In a survey made in June–August, the specific bacterium was isolated from 17 out of 556 jack-rabbits and from 1 out of 277 ground-squirrels shot in the field.

ii. As regards the agency of *Chrysops discalis*, experiments were carried on during the summer months with captured flies allowed to bite, first, guinea-pigs and rabbits experimentally infected with the specific bacterium, and then—from a few seconds up to 24 hours afterwards, and in one case four days afterwards—healthy guinea-pigs and rabbits imported from Washington. Of 38 such experiments 11 were successful. These 11 successful experiments are recorded, and they show that 5 of the guinea-pigs and 6 of the rabbits from Washington died of tularaemia from four to six or seven days after being bitten by the infected flies, and that of these fatally-infected animals one was bitten by a fly that had taken its own infective feed at least four days before.

iii. In laboratory experiments, rabbit lice (*Haemodipsus ventricosus*) taken from rabbits dead of the specific disease and placed on healthy rabbits conveyed a fatal infection to the latter in 20 out of 29 cases. (The nasal secretion and the urine of infected rabbits was also found to be infective when applied to the nasal mucosa or inoculated subcutaneously, but not when given in food). One successful transmission from squirrel to squirrel by squirrel-fleas (*C. acutus*) was also effected.

iv. In all of 10 experiments, bed-bugs (*Cimex lectularius*) transmitted tularaemia, by biting, from infected to healthy mice at intervals ranging from a few seconds to 71 days between the affluent and the effluent bite of infection; the virulence of the bacillus (*Bacterium tularense*) was not appreciably diminished by long sojourn in the bed-bug. White mice also become infected by eating infected bugs, but *not* by eating the fresh bug faeces, although the virulent bacilli are passed in the insects' faeces for a term of at least 120 days, and retain their virulence after 20 days of drying.

v. In 12 out of 17 experiments, mouse-lice (*Polyplax serratus*) transferred from mice dead of tularaemia to healthy mice transmitted the infection. Crushed mouse-mites (*Liponyssus isabellinus*) also transmitted the infection, by inoculation, into healthy mice. The mouse urine was also infective by inoculation.

vi. *Bacterium tularense*, for the cultivation of which yolk of egg was supposed to be necessary, can be cultivated—though not copiously or in full virulence—on serum glucose agar, glucose blood agar, and blood agar; by addition of a piece of fresh tissue to any of these poor media their value is augmented.

vii. Besides the insects mentioned in previous papers *Stomoxys calcitrans* has been proved capable of transmitting the infection of tularaemia.

The present paper shows that the infection can be transmitted without any insect intermediary; it contains an account of the circumstances of infection of six men, all of them experienced in laboratory technique, who became infected merely by dissecting or handling infected rodents. It also contains brief clinical reports of these six cases; and an appendix dealing with the serology in detail.

The following are the summarized conclusions of the first part of the paper:—

"All of the persons (six) who have been intimately engaged during the past two years in the laboratory in handling or dissecting rodents infected with the Utah strains of *Bacterium tularense* have suffered an attack of tularaemia.

"The diagnosis in each of the six cases rests upon the occurrence of a febrile period lasting about three weeks, positive serum reactions for agglutination and complement fixation to antigens composed of *Bacterium tularense*, and the absence of febrile attacks in 100 other persons in the laboratory coming in casual contact with the infected rodents.

"Consideration must be given to the skin of the hands as a possible portal of entry of the infection in laboratory workers even in the absence of a local lesion or lymphadenitis.

"A second attack has recently occurred in Case 1 of the above series, two years and five months after his first attack. The second attack was associated with evident cracks on the fingers, on one of which there developed an inflammatory papule which was soon followed by enlarged, painful, and tender lymph glands in the epitrochlear and

axillary regions of the corresponding side, but without fever or other constitutional disturbance. *Bacterium tularense* was isolated from the papule by guinea-pig inoculation.

"The absence of constitutional symptoms in the second attack, although there was a local lesion and consequent lymphadenitis, is accounted for by the persistence of immune bodies acquired by the first attack.

"Unrecognized cases of tularaemia probably occur in the known foci of infection in the United States, some of which may have febrile attacks without local lesions, while some may have local lesions and a secondary regional lymphadenitis without very notable constitutional disturbance.

"Routine serological tests for agglutination expecially and for complement fixation using antigens composed of *Bacterium tularense* would probably not only detect cases in known foci of infection, but would bring to light unknown foci. Positive serological reactions are known to persist for two years after an attack. Light might be thrown upon the etiology of some fevers of undetermined origin.

"A warning is sounded against unwarranted indifference to an infection, which, in our experience, has claimed all of those who have persistently worked with it in the laboratory."

The clinical reports disclose a definite type of fever, which may be characterized as follows :—Sudden onset with headache, backache and multipresent shifting pains, remarkable lassitude, and fever. The fever lasts for about three weeks, the extreme range of temperature above the normal being about 3½° F. (in one case it reached 104·2°), with a remarkable temporary subsidence to, or nearly to, normal on the 3rd–4th (in one case the 6th) day. The shifting pains may start by radiation from some particular point ; they continue for two weeks to a month, but localized pains of some sort may recur or persist for about 12 months afterwards. In one case that began with dizziness there was rhinitis and occasional slight epistaxis instead of the usual pains. The weakness and languor persist for weeks, and it may be months before the health regains anything approaching its normal vigour. In none of the cases was the infection an inoculation ; but in one case reinfection by inoculation did occur two years after recovery from the first infection, and in the second attack (reinfection) the effects were purely local, namely, an inflamed papule and localized lymphadenitis.

A. A.

i. Francis (Edward). **Tularemia Francis 1921 : A New Disesae of Man.**—*Jl. Amer. Med. Assoc.* 1922. Apr. 8. Vol. 78. No. 14. pp. 1015–1018.

ii. O'Malley (John J.). **Tularemia Francis 1921, developing in a Laboratory Worker.**—*Ibid.* pp. 1018–1020. With 1 chart in text.

i. This paper gives a connected account of the long series of observations and experiments already summarized above. It gives a definition of tularaemia as a specific infectious disease, due to *Bacterium tularense*, transmitted from rodents to man by the bite of an infected bloodsucking insect or by the handling and dissection of infected rodents.

The rodents that have been found infected in nature are the California ground squirrel (*Citellus beecheyi*), the ground squirrel of Utah (*C. mollis*), the cotton-tail rabbits of Southern Indiana, and the jack rabbits of Utah.

The insects known to be capable of transmitting the infection are *Chrysops discalis, Stomoxys calcitrans, Ceratophyllus acutus, Cimex lectularius, Polyplax serratus*, and *Haemodipsus ventricosus*, the first four of which bite both rodents and man.

Human cases hitherto observed have occurred in the summer, the season of *Chrysops discalis*.

ii. This paper contains an account of a case of tularaemia, contracted from close contact with infected laboratory material, which was at first thought to be a case of atypical mild typhoid. It is prefaced by an historical account of the *Bacterium tularense*, beginning with McCoy who, in 1911, encountered an infection which produced in guinea-pigs pathological changes almost indistinguishable from those caused by *Bacillus pestis*, and, in 1912, in collaboration with Chapin isolated a very small, rod-shaped, apparently encapsulated, non-motile gram-negative organism, staining very well with anilin gentian violet, carbolthionin, and carbolfuchsin, but ill with Loeffler's methylene blue, and named it *Bacterium tularense*. The organism does not grow on the ordinary laboratory media, but grows well on a medium of coagulated egg-yolk diluted with 20 per cent. of water or milk sterilized for half-an-hour at 70° C., with a second heating for half-an-hour at 72° C.

A. A.

Wright (Robert E.). **Keratomalacia in Southern India.**—*Brit. Jl. Ophthalm.* 1922. Apr. Vol. 6. No. 4. pp. 164–175.

This paper opens with a discussion of experimental xerophthalmia as seen in animals. The condition is due to deficiency of fat-soluble A vitamin and is readily cured, provided that blindness has not already supervened, by exhibiting butter fat or cod liver oil. "Considerations of the various opinions recorded give the impression that there is a certain amount of confusion as to the relation between keratomalacia in man and that of animals, and also between the different conditions described under this title in man."

To render confusion less on the human side of the condition, the author describes his experiences with keratomalacia in Southern India, together with a valuable note on the subject by Colonel Kirkpatrick. Apart from the eye condition, which is described in detail, constitutional signs are present such as diarrhoea, wasting, jaundice, and sometimes enlargement of the liver. It appears that the keratomalacia of human beings is more complex than that experimentally produced in animals, and it does not respond to feeding with foods rich in fat-soluble A vitamin as does its counterpart. Treatment is slowly successful along the lines of local applications to the eyes and administration of cod liver oil, liver, thyroid extract and salts. "The prognosis as regards sight is bad if both corneae are attacked before treatment is commenced." The prevention of the disease is a matter of economics rather than of medicine.

A. D. Bigland.

BOOK REVIEWS.

CASPARI (Wilhelm) & SCHILLING (Claus). **Ueber den Stoffwechsel der Europäer in den Tropen.** [The Metabolism of Europeans in the Tropics.]—*Ztschr. f. Hyg. u. Infektionskr.* 1920–1921. Vol. 91. pp. 57–132. With 10 text figs.

The present paper is not pathological and does not deal with tropical diseases which for so long rendered hot climates the "white man's grave," but treats of the metabolism of healthy Europeans in the sultry regions of Africa. We know by experience that, provided they escape the ailments peculiar to the tropics and adjust their habits to local conditions, Europeans are well able to adapt themselves to their altered environment and can continue to live there for the usual span of life. This paper confirms this generally accepted thesis by accurate, painstaking and tedious observation.

The three subjects of the experiment were Professor Schilling himself, a powerfully built man of 36, who had resided for varying periods four times before in the tropics, another hefty young man *aet.* 30 who had never been there before, and an assistant in the Customs who had been there many years and was thoroughly habituated to tropical life. His age is not given, but he is spoken of as a big, "pretty fat" individual who took but little exercise. The first and the last on the list had had malaria, but all were in good health at the time of the observations. These seem to date back as far as 1907–10 and were carried out partly at Berlin, except in the third subject, and partly in Africa. The Berlin observations are taken as the control. Those in Africa were carried out partly in the interior and partly on the coast, where the moist heat renders the conditions of life more trying. The results in all the cases were practically identical. As usual in metabolism experiments the food was weighed and analysed. The excreta were similarly examined and the results set out in tables and with meticulous attention to detail; the climatic conditions are similarly dealt with at length. The net result may be put very briefly, namely, that the subjects of the experiment remained in good condition and utilized their nourishment equally well in Africa as they did in Berlin; in work periods in both places the utilization of nutriment was similarly increased.

A curious point is noticed which is left unexplained, namely, a loss of weight in the experimental periods both in Berlin and Africa, both during rest and activity. The total daily intake of food (the usual mixed diet) during the experiments in Berlin gave an energy value of nearly 5,000 calories, and in Africa of nearly 4,000. In the latter meat does not appear on the menu (p. 67) but this may be an omission, for meat is alluded to later as part of the diet, in some observations at any rate. They evidently "did themselves very well"; one may suspect they did themselves even better in non-experimental periods, and the comparative moderation in intake during the actual experiments may have accounted for the loss in weight. They are stated to have rapidly recovered their weight when the restrictions during the experiment were removed. They are stated to have had rather poor appetites, to have partaken freely of water, especially in the damp heat, and this they lost readily through the skin. Pulse, body temperature, and evacuation of the bowels, remained normal throughout. Alcohol (beer) was taken in moderation, mainly for its "psychical" effect. Excess in the use of alcohol is highly reprehensible, especially in hot climates.

Of the protein intake, from 86–92 per cent. was utilized, the lower figures being in observations on the coast during rest periods; of the fat (mainly salted butter) the utilization figure was more constant (96–97 per cent.); of the total calories from 94–96 per cent. These figures were about the same as in the Berlin observations, and compare favourably with those recorded by EIJKMAN for Malayan subjects.

Thus, life in the tropics is bearable and should be perfectly healthy. The observations are only on three individuals, but they tally, as said before, with what is known by everyday experience in those who live wisely.

W. D. Halliburton.

WATERS (Ernest E.) [M.D. (Edin.), M.R.C.P. (Lond.), Lieut.-Col., I.M.S.; Supt., Presidency General Hospital, Calcutta]. **Diabetes: Its Causation and Treatment with Special Reference to the Tropics.** 2nd Edition.—ix+276 pp. With 8 charts and 1 coloured plate. 1922. Calcutta & Simla: Thacker, Spink & Co. [Price 15*s*.]

The first edition of this book was rapidly sold and, for nearly two years, had been out of print when Lt.-Colonel Waters was asked to prepare the volume now reviewed. With the passage of time the book has increased in size and in price—doubled in both instances. Increase in size is due to the incorporation of new cases and several complete and modern "tables" of food analyses. The first edition was fully reviewed in this *Bulletin*, Vol. 11, p. 470.

The Allen and Joslin treatment by fasting still holds out hope, as shown by some of the cases treated by Colonel Waters. Where the glycogenic mechanism is merely strained re-education may be possible, but it is difficult to believe that damaged tissue, whether nervous, pancreatic or hepatic, can be repaired during short fasts. Dr. JOSLIN has given up the use of alkalies during diabetic coma; indeed he believes them to be dangerous, an opinion not generally held. Of drugs opium, with purgatives when necessary, maintains its place. Not only does opium control the nervous symptoms, but as shown in Case IV, p. 198, it may enable the patient to bear the discomfort of the necessary fasting periods. Colonel Waters has treated boils and carbuncles with colloidal tin and palladium. A crop of boils vanished under treatment with colloidal manganese. Attention is drawn to the desirability of care of the teeth. Daily exercise is also insisted on. In the chapter on "Prognosis and Treatment" the mortality statistics are still from outside the tropics. JOSLIN's table, 1894–1915 gives deaths without coma, 147; with coma, 273, the direct opposite of what occurs in both east and west tropics where coma is not very common. The typographical defect noticed in the 1st Edition is less in evidence but there are still a few letters in "abnormal attitudes."

J. H. Tull Walsh.

LUCIE-SMITH (J. D.) [Editor]. **A Text Book for Teachers of Hygiene. Malaria, Hookworm, etc.** [Explanatory Preface by GIFFORD (L.).] —51 pp. 1921. Government Printing Office, Kingston. [Price not stated.]

This somewhat ambiguously intituled book—it is little more than a pamphlet—is meant for the guidance of teachers in elementary schools: it consists of short essays and lectures, supplemented and reinforced by aphorisms and precepts, and, besides the simple principles of hygiene, includes in its scope malaria, hookworm, and the subject of venereal disease.

The essay on the general principles and practice of personal and domestic hygiene, by the Rev. W. GRAHAM, is pithy and very much to the point; and that by Miss CARRINGTON on the same subject has the merit from the educational standpoint of recognizing that out of the heart are the issues of life. Dr. D. J. WILLIAMS imparts in simple language information on the causes, direct and contributory, of consumption, typhoid fever, diphtheria, yaws, and malaria, and explains the general precautions that

may be taken against these infections ; and Dr. B. E. WASHBURN does the same for hookworm, but goes into more detail with regard to its effects and its treatment. The subject of venereal diseases is treated by Dr. TAYLOR-PENGELLY and Messrs. ROSE and LAWRENCE. Dr. TAYLOR-PENGELLY deals in a few words with the delicate matter that brought such trouble to Eve and Adam long ago, and goes on to explain how venereal diseases are contracted and what their effects are ; Mr. ROSE speaks to boys, in graphic language, of the effects of venereal disease and of the necessity of prompt confession to the medical man ; Mr. LAWRENCE suggests the way in which the subject might be broached to girls.

A. Alcock.

WOLBACH (S. Burt), TODD (John L.) & PALFREY (Francis W.). **The Etiology and Pathology of Typhus. Being the Main Report of the Typhus Research Commission of the League of Red Cross Societies to Poland.**—pp. x + 222. With 34 plates and 13 figs. 1922. Published by the League of Red Cross Societies at the Harvard University Press, Cambridge, Mass. [Price 35*s*.]

This work is the main report, published in book form, of the Commission sent in 1920 by the League of Red Cross Societies to Poland for the purpose of making researches upon typhus. It is stated in the introductory chapter that "the determination of the specific cause of the disease was held as the most important goal," and, as the main result of their investigation, the Commission arrive at the definite conclusion that the specific cause of typhus is *Rickettsia prowazeki*. The observations and arguments on which this conclusion is based may be presented in summary form as follows :—

1. As an essential preliminary, a supply of lice was obtained from typhus-free localities, some from Montreal, others from London, the latter being part of a stock that for over two years had been under observation and known to be free from rickettsia. At the outset of the research a large number of control examinations of smears and serial sections were made with uniformly negative results.

2. The lice, enclosed in suitable boxes, were fed on cases of clinically well-established typhus, selected from patients admitted to the St. Stanislaw Hospital at Warsaw, and removed to special observation wards which were reserved in the hospital for the exclusive purposes of the Commission. Cases were chosen with a view to including both early and severe types of the disease. As a result of the feeding experiments the lice in a large proportion of the boxes became heavily infected with rickettsia. The experiments were not uniformly successful ; observations were made with 52 boxes, and only in 27 of these were the lice found to be infected ; but as, in the course of the research, the most favourable conditions as regards temperature and routine of feeding became known, so the incidence of infection rose, and of the last 21 boxes a positive result was obtained in 18, *i.e.*, 86 per cent.

3. Examination showed that the infection of the louse was limited to the alimentary tract below the oesophagus, and that the rickettsia bodies were wholly intracellular, the diseased epithelial cells being greatly distended, often protruding into the lumen of the gut, and closely packed with parasites. A marked degree of pleomorphism was observed in the rickettsia, elongated bacilliform and filamenteus forms being present, in addition to the more usual small coccal forms. Mainly on account of their intracellular location and pleomorphic character, the bodies were identified as *Rickettsia prowazeki*.

4. Emulsions were then made of the viscera of infected lice, and injected into the peritoneum of guinea-pigs, one louse being used for each guinea-pig, with the result that, after an incubation period of 7–13 days, the guinea-pigs developed a short febrile illness which was regarded, for reasons to be stated, as typhus. Every one of nine guinea-pigs treated in this way

became pyrexic, and in eight of these further investigations were made by which it was established either (*a*) that a state of immunity had been induced against the effects of inoculation with blood taken from patients ill with typhus, or (*b*) that subinoculation of other guinea-pigs produced a febrile disorder, similarly followed by a state of immunity against human typhus, or (*c*) that histological lesions were present in the brain and tissues essentially similar to the lesions found after death in human subjects, and regarded by the authors as peculiar to the disease. In each guinea-pig of the series a positive result was obtained with one or more of these control tests, and it was therefore concluded that the febrile reaction to the injection of rickettsia-containing lice was typhus.

5. Other guinea-pigs were injected with lice in which no rickettsia were found, with the following results :—(*a*) Some of the lice had been taken from " positive " boxes, *i.e.*, boxes containing other lice infected with rickettsia ; of 13 guinea-pigs inoculated with these lice four developed a febrile illness which, on the above criteria, was regarded as typhus, while seven remained well. (*b*) Other lice were taken from " negative " boxes, the contents of which were wholly free from rickettsia. In 12 such cases not only was no fever produced, but by subsequent inoculation with blood from typhus patients it was shown that the guinea-pigs had acquired no degree of immunity. There remain four experiments, the results of which, although the guinea-pigs did not develop typhus, were for various reasons regarded as open to question, and are therefore best left out of account.

6. Histological investigations on the human subject were made in a large number of cases. These comprised (*a*) the examination of portions of skin excised during life (28 cases), and (*b*) post-mortem observations. The importance of examination as soon as possible after death is emphasized, and in 16 of the cases the autopsy was made within two hours of death. Lesions are described in the skin, central nervous system, and elsewhere, which the authors regard as peculiar to the disease. In the skin, changes were observed as early as the first day of the rash, consisting of swelling of the endothelium of capillaries and other minute vessels, and an accumulation of polymorphonuclear leucocytes in the adjacent connective tissue. At a later stage compact " typhus nodules " were observed, lymphoid and plasma cells, mast cells, and polymorphonuclear corpuscles entering into the composition of the nodule, at the centre of which a small vessel was usually distinguishable, containing thrombus adhering to the wall or blocking the lumen. In the brain, similar small tubercle-like lesions were found to be composed of two elements, some of the cells being derived from vascular endothelium, others from a neuroglial proliferation. Stress is laid on the vascular origin of all these lesions, and in many instances the swollen endothelial cells presented a granular or stippled appearance, which is attributed to the presence of masses of rickettsia bodies. In view of the possibility of mistaking various kinds of granules for rickettsia, great importance is attached to the localization of these bodies in the endothelial cells, the protoplasm of which is normally non-granular except during the process of cell-division. The conclusion is drawn that the tissue changes leading to the formation of the " typhus nodule " are the direct result of the invasion of vascular endothelium by rickettsia. It may be remarked in this connexion that the endothelial cells are not, under the circumstances, in a normal state, but, apart from the possible presence of parasitic bodies, are undergoing intrinsic activities that might be expected to cause a deviation from their usual hyaline appearance.

Rickettsia-like bodies were found in 21 of the 28 specimens of skin removed from living patients ; of the post-mortem material, these bodies were demonstrated in the skin of 25 cases, the brain of seven, the testes of five, kidneys of two, and femoral vein of one case.

7. Lesions in all essential respects identical with those in human beings were found in guinea-pigs, though relatively the brain lesions were more conspicuous and the cutaneous lesions less so than in man. The presence of rickettsia-like bodies was less constantly established, a circumstance

which is attributed partly to the fact that less time was given to the search, and partly to the short duration of the disease in the guinea-pig.

The ultimate conclusion of the authors is that *Rickettsia prowazeki* is the cause of typhus, which they regard as a disease primarily of the small vessels, in whose endothelial lining the parasite is almost exclusively located. The mode of conveyance of the virus from the louse to the human subject is left uncertain. In no instance were rickettsia observed in the salivary glands or oesophagus of the louse, and it is suggested that the parasites may escape from the louse in the faeces, and be introduced by scratching, or by the mouth parts of the louse which have become soiled with faecal material.

Whether or not the claim of the authors that the specific cause of typhus has been definitely determined be regarded as proved, the work of the Commission is of outstanding importance, and takes its place among the notable contributions to the pathology of typhus of recent times. The research is planned on carefully considered lines, and the results of the several experiments and observations are set out in clear detail, and their significance is discussed in a spirit of critical enquiry. The experimental evidence establishes a strong case in favour of the view that there is some association of a very close character between the virus of typhus and rickettsia bodies; but, in considering the case for the identity of the two, much depends on the nature of the granular structures described in the vascular endothelium. The authors are clearly alive to the possible fallacies in the interpretation of the appearances figured in the series of beautiful drawings and microphotographs which are appended in illustration of the text, and would doubtless readily admit that confirmatory observations are necessary before the identity of the intracellular granules with the virus of the disease can be regarded as definitely established.

An incident of considerable interest arose in the course of the research when Mr. Bacot, the entomologist to the Commission, whose recent death in the pursuance of further investigations on typhus we have to deplore, was taken ill with trench fever. The lice for whose nourishment he had been personally responsible thereafter became heavily infected with bodies which, from their morphology and extracellular location, were identified as *Rickettsia pediculi*. The Commission regard these as identical with *R. quintana* and *R. wolhynica*, all three being forms that have been described by different observers as the causal agents of trench fever. The infected stock of lice was discarded from use for the purposes of the research.

A. G. Phear.